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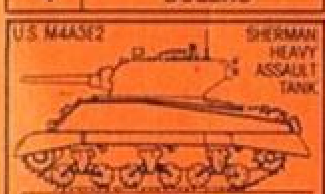
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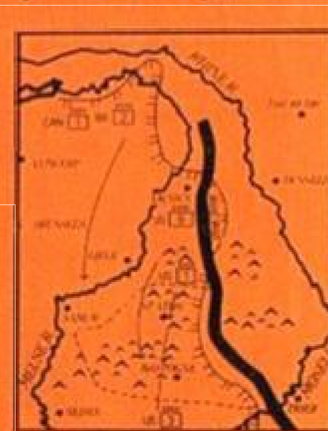
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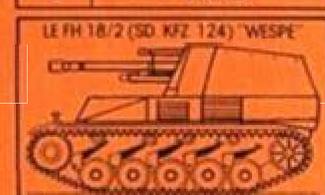
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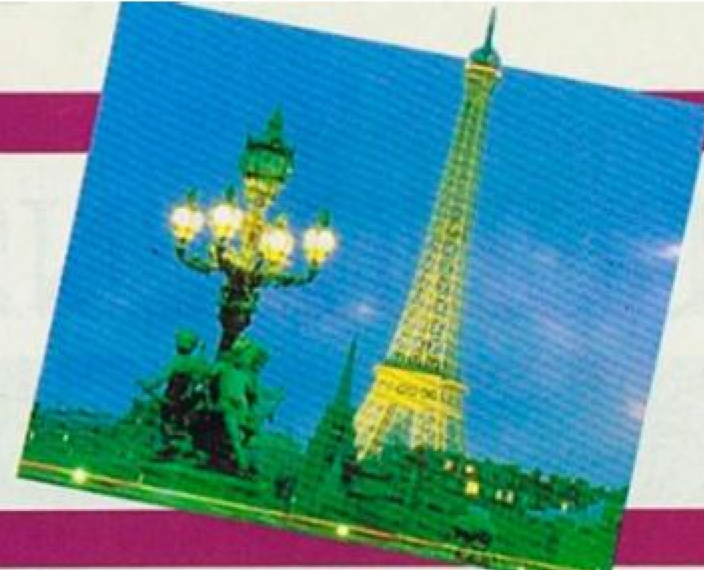
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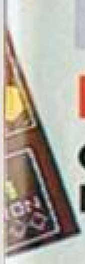
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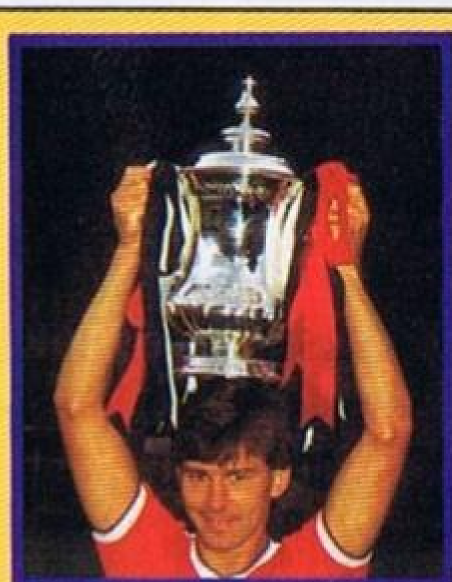
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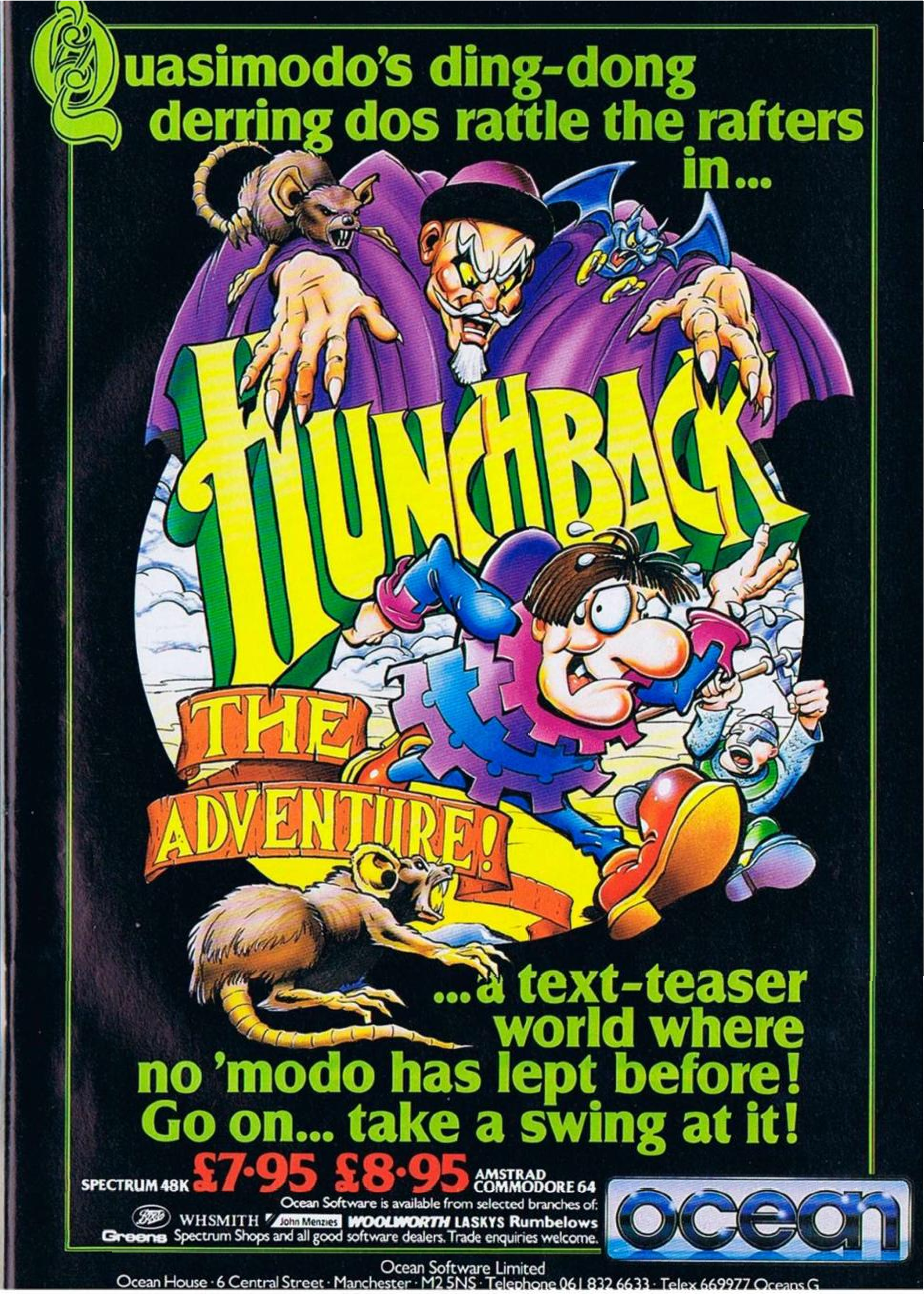
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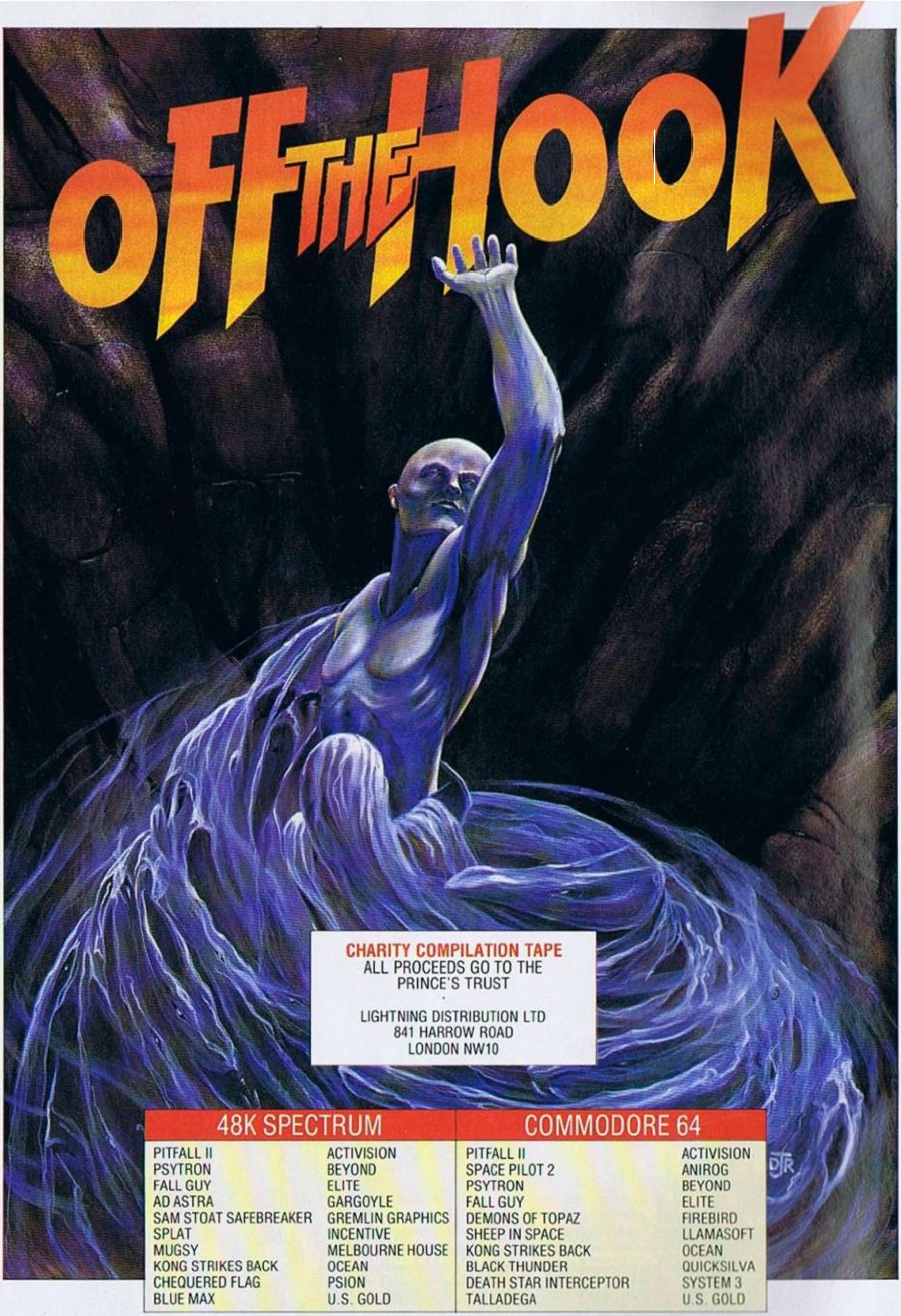
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A BITTER PILL

If you have been trekking in the Himalayas or in a deep coma for the last few weeks, the news that Alan Sugar's Amstrad company has taken over Sir Clive Sinclair's computer division will be a surprise to you. Assuming that you can count yourself among the vast majority of people in the U.K., the news will have been flashed on your TV set and the front page of your daily newspaper.

Under headlines such as Sinclair's empire broken up and Sir Clive swallows Sugar's bitter pill, the mass media commentators gave Sir Clive's dirty financial linen a more than adequate airing, so to repeat such details in these pages would serve no useful purpose. To speculate on the type of computers the combined Amstrad/Sinclair stable will be producing in the coming years and the impact any such products will have on the home computer market should, however, be of considerable interest.

At the press conference at which the end of Sir Clive's involvement in home computers was announced, Sugar gave a few clues as to the likely shape of things to come.

The first point to emerge was that Sinclair branded computers would be marketed as entertainment computers, which in essence means that they will be the cheapest models in the combined companies' range. Cheapest to Sugar means no less than £139 – the Amstrad chairman clearly saw no place for the £50 computer in the market.

While in the past cheap computers have been associated with unreliable computers, particularly in Sinclair's case, Amstrad will work hard to change that. While Sugar stated that his aim will be to keep assembly of Sinclair computers within the U.K., both quality and ex-factory price will have to meet his requirements. Software houses, too, will be expected to work to improve the quality of their Spectrum software. To that end, Amstrad will introduce some form of approval system. Software which met the SQC – Sinclair Quality Control – standards would be able to incorporate a special logo as part of its packaging and would benefit from the force of the Amstrad marketing operation.

The most obvious change to the Spectrum series of computers will be that the existing machines will be replaced by a computer complete with a bolt-on cassette recorder, a la CPC464. It is unlikely that the Spectrum will form part of a bundled system complete with monitor, as that would take the price of the machine beyond the impulse-buy breakpoint of an entertainment machine.

Another odds-on bet is that a Spectrum equivalent of the CPC6128 will soon make an appearance – that is a Spectrum complete with built-in disc drive. At the launch of the CPC6128, Sugar stated that any new machine reaching the market in 1986 would have to feature a built-in disc drive and, as such a machine was rumoured to be close to launch when the Sinclair/Amstrad deal was signed, it could well be the first product to emerge from the new company.

As to the Pandora, Sinclair's no-compromise portable project, Sugar was making no firm commitment to the project. While Amstrad undoubtedly will have first refusal to this computer, it could be that Sugar's idea of no compromise differs greatly from that of Sir Clive's and that the Pandora could fail to reach the market.

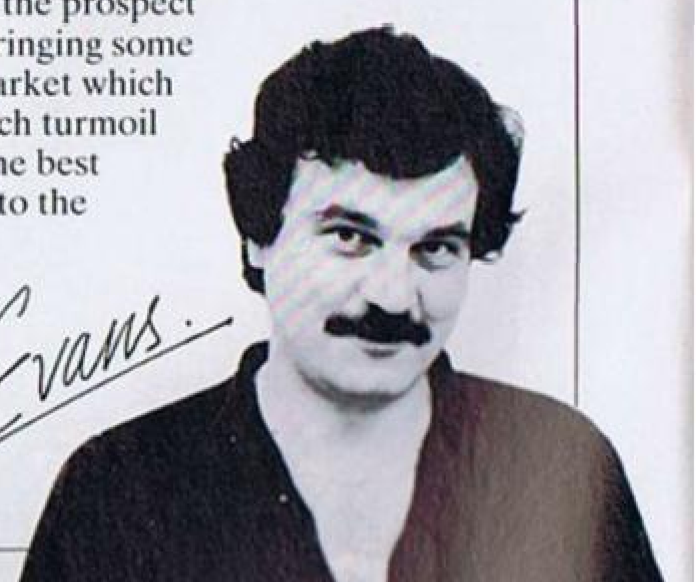
The future of the QL, too, looks in doubt. While Sugar is commited to sell existing stocks and to accept delivery of any units still in the production, the development of the QL is unlikely to feature in Amstrad plans.

Amstrad branded products will be promoted as more serious machines; in Sugar's language they will appeal to the step-up buyer. That means that the CPC6128 will continue to represent the mainstay of the range, with the PCW computers continuing to build on their share of the market.

A 68000 WIMPS computer is rumoured to be close to launch, with some reports suggesting that it could be an Amiga-like clone at an affordable price. If Amstrad computers are to be seen as upgrade machines, there will have to be a 16-bit product at the top of the range. While in the past the company has fought shy of 16-bit products, preferring the "tried and tested technology of 8-bit machines", the time is now right to commit resources to 16-bit development.

At a stroke, Sugar has taken a stranglehold on the U.K. home computer market. Whether, in the long term, it is a good or bad thing only time will tell. Sugar, though, is a shrewd businessman and the prospect of his company bringing some stability to the market which has known so much turmoil could be one of the best things to happen to the industry.

Gary Evans.



News Editor: Geof Wheelwright



Small Loss in Cambridge - not many dead



The once-mighty corporate oak of Cambridge, Acorn Computers, is starting to bear fruit again, after a year of heavy losses and severe cutbacks. Users of the BBC Micro and Electron will be happy to hear that the manufacturer of their machines is almost out of the red, declaring £1.7 million in losses for the six months ending in December, 1985. The company sold about £20 million worth of computers in that period and managing director Brian Long says Acorn is now back on the long road to profitability.

"Acorn has stopped going down," he says. "This will be a year of selling energetically, what we have today, plus a fair amount of spending of RISC – Reduced Instruction Set Computer – technology.

Despite the fact that parent company Olivetti seems to have given up on trying to push the Acorn BBC micro in Europe, Long is buoyant about the new directions in which he is taking the company. He says it will expand to include some pure high-technology research and development work; many OEM deals with manufacturers, where Acorn designs equipment which can be sold under another company's name and further exploitation of specialist computer markets such as that represented by the computer-phone business the company entered into with the launch of its Communicator machine last year.

As far as the new BBC machines go, however, there has been delays in getting some of the models to the shops, notably the MS-DOS-based Master 512 which uses the Macintosh-like Gem operating system and which will read some IBM PC data files. Long did not comment on suggestions that the delay has anything to do with a concern by Olivetti that Acorn might be trying to move in on its MS-DOS business market.

Cheap MAC to bash ST

Apple will launch a low-cost Macintosh-like machine based on its Apple II technology in the next few months. Apple chief John Sculley says the company will be bringing the Apple II and Macintosh lines of computers much closer together this year and that a new low-cost Apple II machine with Mac capabilities will be a part of that plan.

He is not particularly worred about Mac imitators such as the Commodore Amiga and Atari ST series, both of which will be entirely eclipsed by new Apple II and Mac offerings. He suggested that neither Atari nor Commodore has the confidence of the business community and that the new Apple machine will take away the limelight those companies have been gaining in the up-market home and small business arenas.

"We will be bringing the look and feel of the Macintosh to the Apple II," he says. "We started last fall with mouse-driven software for the Apple II, which can run in colour, and we are now launching peripherals which can be used either by the Macintosh or the Apple II. Thirt-party software houses have seen what we are planning with the new machines and are developing software for them."

Sculley emphasises, however, that Apple is not about to get into a price war with anyone and would stay aloof from the battles which are driving the ocst of a basic IBM PC compatible close to £500.

"The struggle at the very low end of the market gets even more fierce as the clone machines come into play," he says. "We have avoided getting into that scrap."

The president and chief executive of Apple also warned Commodore and Atari that they will not win orders in business markets if the business community thinks they have any financial difficulties. "People don't want to bet their businesses on companies which are not financially strong."

YOUR COMPUTER NEEDS YOU
SEE PAGE 86

Budget Gold

U.S. Gold is about to launch eight games at £2.99 on a new budget label called Americana. Most of the titles destined for release are from major U.S. software house. They include *Breakdance* from *Epyx* and *Moonshuttle* from Datasoft.

It is planned to have all eight games released some time in May on Commodore, Spectrum and Atari; Amstrad conversions will be released some time later.

U.S. Gold does not plan to release any games on the C16 at the moment, which is one of Mastertronics major budget markets. The £2.99 price puts the games in head-on competition with the Mastertronics *Mad* range of games.

A spokesman for U.S. Gold says: "The titles at the moment are mainly arcade titles but that is not a deliberate policy – it is just what was available. We are aiming for games of high quality and playability."

THE CHARTS

This chart is based on the *MicroScope* chart as compiled by Gallup.

MicroScope GALLUP

MicroScope is the weekly trade paper of the microcomputer industry. If your computer store doesn't display the latest *MicroScope* chart, ask the manager to call Mark Salmon on 01-631 1433 — we'll send a copy every week.

AMSTRAD TOP 10

TM	LM	Title	Publisher
1	NE	Rambo	Ocean
2	NE	Finders Keepers	Mastertronic
3	6	Formula One Simulator	Mastertronic
4	5	They Sold A Million	Hit Squad
5	NE	Way Of The Tiger	Gremlin Graphics
6	3	Yie Ar Kung Fu	Imagine
7	2	Sky Fox	Ariolasoft
8	NE	Spindizzy	Electric Dreams
9	NE	Comp. Hits 10 Vol 2	Beau Jolly
10	NE	One Man And His Droid	Mastertronic

TOP 30 OVERALL CHART

LM	TM	Title	Publisher
1	NE	Uridium	Hewson Consultants
2	1	Yie Ar Kung Fu	Imagine
3	8	Commando	Elite
4	3	Formula One Simulator	Mastertronic
5	19	One Man And His Droid	Mastertronic
6	NE	FA Cup Football	Virgin
7	NE	Way Of The Tiger	Gremlin Graphics
8	NE	Hardball	US Gold
9	13	Rambo	Ocean
10	NE	Superbowl	Ocean
11	NE	Sky Fox	Ariolasoft
12	10	Action Biker	Mastertronic
13	6	Hypersports	Imagine
14	9	Finders Keepers	Mastertronic
15	NE	Ping Pong	Konami
16	NE	Mr Puniverse	Mastertronic
17	NE	Green Beret	Imagine
18	14	Movie	Imagine
19	NE	Comp. Hits 10 Vol 2	Beau Jolly
20	25	Way Of The Exploding Fist	Melbourne House
21	5	Winter Games	Epyx/US Gold
22	NE	BMX Racers	Mastertronic
23	NE	Last V8	Mastertronic
24	NE	Incredible Shrinking Fireman	Mastertronic
25	18	Barry McGuigan World Champ	Activision
26	NE	Bomb Jack	Elite
27	NE	Zoids	Martech
28	NE	Winter Olympics	Tynesoft
29	NE	They Sold A Million	Hit Squad
30	15	Computer Hits (10)	Beau Jolly

COMMODORE TOP 10

TM	LM	Title	Publisher
1	NE	Uridium	Hewson Consultants
2	NE	Hardball	US Gold
3	2	Yie Ar Kung Fu	Imagine
4	NE	Superbowl	Ocean
5	1	Kung Fu Master	US Gold
6	NE	Electra Glide	English
7	NE	Zoids	Martech
8	6	Kane	Mastertronic
9	4	Eidolon	Activision
10	NE	FA Cup Football	Virgin

SPECTRUM TOP 10

TM	LM	Title	Publisher
1	NE	Way Of The Tiger	Gremlin Graphics
2	NE	Green Beret	Imagine
3	1	Movie	Imagine
4	NE	FA Cup Football	Virgin
5	NE	Sky Fox	Ariolasoft
6	NE	Incredible Shrinking Fireman	Mastertronic
7	NE	Bomb Jack	Elite
8	NE	Turbo Esprit	Durell
9	NE	Superbowl	Ocean
10	2	Winter Games	Epyx/US Gold

BUBBLING UNDER

Title	Publisher
Elite	Acornsoft
Spellbound	Mastertronic
Turbo Esprit	Durell
Electra Glide	English
Spitfire	Mirrorsoft
Devils Crown	Probe
Mercenary	Novagen
Eidolon	Activision
V	Ocean
Soul of A Robot	Mastertronic

STAR STRIKE II

▶ *Spectrum* ● *Real Time* ● *Shoot-em-up* ● *Lee Paddon* ● *£7.95*

GRAPHICS
● ● ● ●
SOUND
● ●
PLAYABILITY
● ● ● ●
VALUE FOR MONEY
● ● ● ●
OVERALL
● ● ● ●

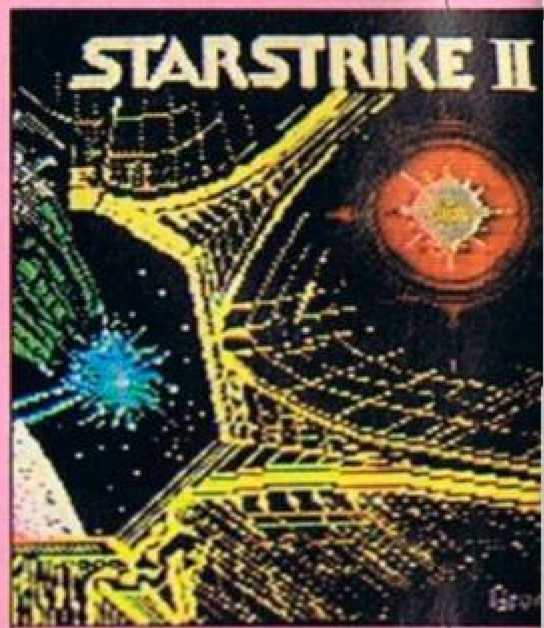
Real Time is one of the "sleepers" of this industry. It does not do much but when it does, it is explosive. *Star Strike II* takes up from where *Star Strike* left off. Now not only do you have to fly down a trench, you have to fly through some cleverly-constructed defences.

You must "neutralise" 22 enemy planets. After you have dealt with one planet, you have a chance to replenish your stores of fuel and shields. There is a limit, however, so completing the game requires very careful husbanding of resources.

After you have selected the planet and system you want to attack, you have six layers of defences to get through, which seem to plagarise almost every theme is space battles.

First you have to dock with a space station, *Elite* style, often knocking-out its defences. After that you must go through a series of defence fields, which appear as a grid hanging in space, with one hole, defended by the usual deadly array of missiles and fighters. Then it is on to do battle with the orbitting fighters. For that section you have a head-up display like *Starion.*

Great graphics and a simple, violent theme, with an element of overall strategy makes this a sure-fire winner with the space zap fraternity.



ALIEN HIGHWAY

▶ *Spectrum & Amstrad* ● *Vortex* ● *Shoot-em-up* ● *Lee Paddon* ● *Spectrum £7.95; Amstrad £8.95*



Having seen off the Aliens in Highway Encounter, you have decided to deal with the baddies at source. Once again you control the Vorton and must guide the ultimate weapon, the Terratron, up the highway. Naturally, the surroundings are then suitably abstract and alien and the baddies are faster and thicker on the ground.

Each time you play the game, the set-up is different. While sometimes that leads to virtually impossible situations, it prevents boredom. You have to energise your Terratron, which you are pushing up the highway. That also re-energises your Vorton, to replace energy lost by collision with the border and the aliens. After a dearth of good Spectrum releases, this will be up there with the rest of the recent surge.

GRAPHICS
● ● ● ● ●
SOUND
● ●
PLAYABILITY
● ● ● ●
VALUE FOR MONEY
● ● ● ●
OVERALL
● ● ● ● ●

QUAZATRON

▶ *Spectrum* ● *Hewson Consultants* ● *Shoot-'em-up* ● *£8.95*

Remember Paradroid? The stunning original arcade game that made Andrew Braybrook a name spoken in hushed tones at every computer club. Well this is better!

Steve Turner, author of Avalon, Dragontorc and Astro-Clone, has taken Andrew's idea, added some nice graphics, tweaked the plot and produced a game which will have arcade and strategy fans alike beating a path to Hewson's door. You start off a humble, menial robot in the city of Quazatron, which is swarming with enemy robots of varying degrees of lethality. Your job is to wipe them out. This is no simple arcade game. You can have reflexes so sharp they hurt, and you still won't win. The idea is not only to blast away, but to get in close and "grapple" with the enemy. You then move on to a takeover screen, which is a battle to outwit the enemy robot by invading his logic circuits.

Once again, Hewson have set the standard that others must follow.

GRAPHICS
● ● ● ● ●
SOUND
● ● ●
PLAYABILITY
● ● ● ●
VALUE FOR MONEY
● ● ● ●
OVERALL
● ● ● ● ●



STOP PRESS

THE GAME

▶ CBM64 & Spectrum ● Ocean ● Shoot-'em-up ● Lee Paddon ● CBM64 £8.95; Spectrum £7.95

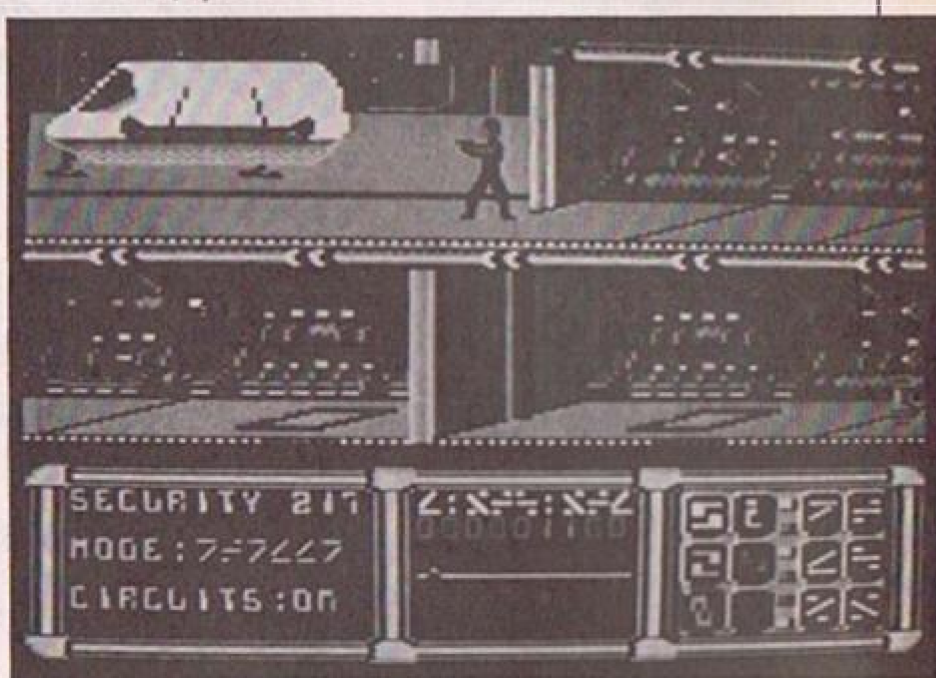
Can you strike more heroic poses than Marc Stringer without messing up your hairdo? Can you wipe out more of your own crew than Dianna? Such are the problems posed by the game of the TV series.

Michael Donavan has caught the regular alien shuttle to the mother ship, dodged the guards, and is now alone. All he has to do is set explosive charges in various vital parts of the mother ship, spread a little red dust around the place and find the exit.

Despite the pulp science fiction plot, Ocean have managed to produce an intricate and fascinating game.

You start the game in the hanger, with locked doors around you. This forces you to explore the resources of the "Comuniputer". The game is joystick driven. Pulling the joystick down gives you access to the little information computer you carry around with you. This is a handy gadget. Picking locks, digging around in handy alien computer terminals, nothing is beyond it. Picking locks can be a problem which may mean you never see more of the ship than the first screen. The tip is to get the digits on the Security Code all the same.

This is a clever, intricate, game with good graphics and sound. Lots of blasting of harmless robots, and plenty of plot. Another strong contender for the late Easter present.



GRAPHICS ● ● ● ●

SOUND ● ● ●

PLAYABILITY ● ●

VALUE FOR MONEY ● ● ● ●

OVERALL ● ● ● ●

SOFTWARE NEWS

Comet fever

Comet fever has hit software houses. With the industry's usual inimicable timing, Haley will virtually have returned to the icy wastes of outer space by the time the programs appear. Mira Software has produced *Skyview*, a Spectrum utility for plotting the movement across the night sky of comets, stars, planets and galaxies.

For those with a more frivolous interest in such things, Firebird has produced *The Comet Game*. Released on the hot range at £7.95 for a range of machines, the Earth is, as usual, in deadly peril. Naturally, the comet is plummeting straight towards Earth and only you can stop it. You have to pilot your vessel near the comet and then blast away at the germs on the surface before they can contaminate earth.

Let us just hope firebird can stay around for another 75 years and re-launch the game to coincide with Haley's return.

Mira Software can be contacted at P.O. Box 110, Kidlington, Oxford OX5 2NG.

Your move mate

Are you tired of word processing on your 8256? Do you fancy a little chess? CP Software and Amsoft are eager to please. The CP Software offering is a version of its well-received chess program for the Spectrum. It has all the usual features, like problem moves, hint, blitz play and select level.

If you consider yourself something of a buff, *Cyrus II* might be worth waiting for.

Variety of compilations available

Superanuated software at knockdown prices. That is what compilations are all about. Now there is a bewildering variety on offer. Top of the range is *Hotshots* from The Force. For £9.95, it offers four programs – Shadowfire, Gron, Fighting Warrior and Mindshadow. All have made recent chart appearances for the Commodore and Spectrum, so it looks like a good value package if you did not catch them first time round.

Gremlin Graphics has released a compilation of chartbusters for the Spectrum and Commodore, also at £9.95. Argus Press, on the other hand, obviously believes in the maxim "never mind the quality, feel the width". Its compilations on the Commodore and Spectrum feature 30 games which could scarcely be described as recent top-of-the-charts material. At £9.95, that works out at 33 pence per game, about which is difficult to complain.

Quill for the BBC

The Quill, the best-selling adventure game writer, has been released on the BBC and Electron computers. The price is £16.95 on cassette and £22.95 on disc.

An illustrator, to add graphics to your adventures, is also planned. The program is compatible with the BBC Plus and the Master series. Gilsoft can be contacted on 0446 732765.

BT's Revenge

Beyond, now flying under BT colours after a time in the wilderness, is planning to bounce back with some big releases. *Doomdark's Revenge* on the Commodore is reviewed elsewhere, and Amstrad and Atari versions are planned. *Bounces* has just been released for the Spectrum. It is a light-hearted game of combat croquet. You can either aim to fire the ball into one of the scoring gates or straight at your opponent. One or two can play and the computer can play at beginner or expert level. Despite the Denton Designs hallmark, it is really only a pot-boiler with a £9.95 price tag.

Elsewhere, Mike Singleton, the most successful Beyond programmer, has three icons in the fire. *Quake Minus One* is finally to be released, *Dark Sceptre* is on the way, and *I of the Moon*, the last in the Doomdark trilogy, is scheduled for September.

Dark Sceptre is a medieval fantasy game which is based on a play-by-mail game which Singleton will be running privately. Apparently, he decided to write a new play-by-mail game after his last highly-successful game, *Starlord*, was ruined when his Pet computer finally gave up the ghost.

I of the Moon promises to be the biggest and best of the Midnight trilogy with no fewer than 170,000 locations. For those who cannot wait, a full dramatisation of the tale can be heard by dialling 00771 1156.

Nexus at last



Nexus, the long-awaited arcade adventure game from Beyond, is about to be released – by Nexus.

Nexus, the company, was set up by Bill Delaney and Clive Bailey, two departures from Beyond who jumped ship when the company was taken over by British Telecom. Nexus, the game, is about a journalist trying to discover what is behind a secret organisation, whose underground complex he discovers.

Unfortunately, the usual Box Brownie and notebook will not be sufficient here. Our hero will need plenty of help from the resistance organisation within the complex if he is to succeed. He will also need some training in unarmed combat and weapons.

"It is not just a shoot-'em-up, although it could be played like that," according to Bailey. That element is there to get you into the game. Once you are disillusioned with that, it is time for the game proper. If you become too trigger-happy, members of the underground will refuse to help you.

Nexus will be released for the Spectrum, Amstrad and Commodore machines.

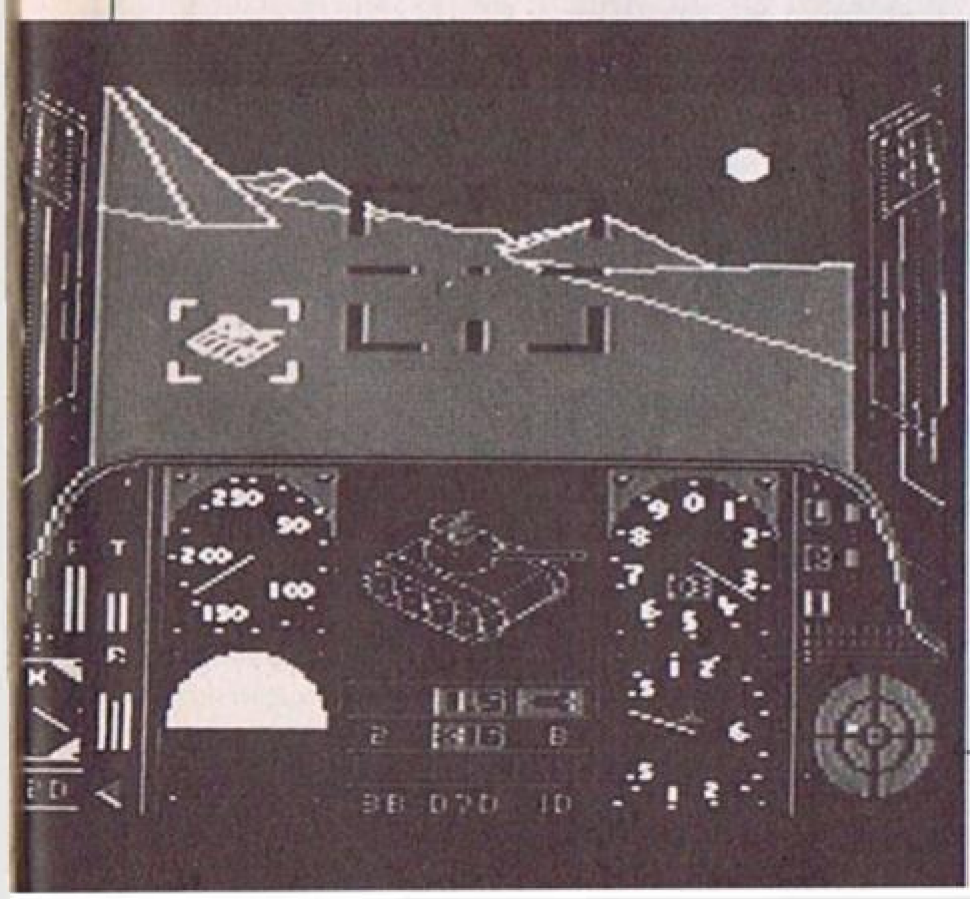
Alligator dares to win

Who Dares Wins II is on the Spectrum from Alligata Software for £7.95. It is a conversion of the highly-acclaimed shoot-'em-up which appeared originally for the Commodore.

Despite fierce competition from Commando and Rambo, this, for most people's money, was the pick of the bunch for the blaze-away brigade. The scenario is simple, you must work your way up the screen shooting guards, freeing prisoners and causing general mayhem.

You have a machine gun plus a limited supply of grenades which can be replenished by grabbing the odd box dropped by passing planes. You are confronted by soldiers, aeroplanes, tanks and trucks. The conversion to the Spectrum loses nothing, except in the sound department.

U.S. big guns



Microprose, the American simulator specialist, is set to make a big splash on this side of the Atlantic. On a recent visit to the U.K., Bill Stealey, president of the company, outlined his intention to take the software market by storm.

He plans to convert his best-selling Commodore titles on to Spectrum and Amstrad machines, as well as to continue the company's series of games on the Commodore. *Silent Service*, reviewed in this issue, will arrive later this year, along with *Gunship*, a simulation of the Apache attack helicopter, the same machine covered by Digital Integration in *Tomahawk*.

Stealey has no fears about the competition. "Our simulators are tried by army pilots – they are 100 percent accurate," he says. The terrain will be in full 3D and all the technology which goes to make up the Apache will be there, including the TADS "look and shoot" sytstem.

F15 Strike Eagle will also be converted to Spectrum and Amstrad and should be in the shops in the summer. Despite all this activity, Microprose is not forgetting its Commodore roots and has just launched *Acrojet*, which is all about stunt-flying in a BD5J aircraft, as used by James Bond in Octopussy. It should appeal to people who feel they are capable of dealing with what must be the ultimate in flight simulator challenges – not just to fly and land in one piece but to do it as quickly and neatly as possible. It is also planned to simulate submarine hunting in the Atlantic, the other side of the Silent Service coin.

Hi-res pictures come to the net

Joining *Filebox*, a mailbox data transfer system for BBC users released earlier this year, *Sketchcode* is another enhancement for Micronet BBC users developed by Prestel Microcomputing. Once again, you need to download a special data-handling program which then enables specially-prepared, high-resolution pictures to be downloaded and displayed while remaining on-line.

Graphics mode 1 is used and that allows a degree of shading which looks like fine through a mono monitor but appear as false colours when viewed in colour. The digitised pictures, which may include photographs, are data-compressed and uploaded in error-protected blocks. Unless you have a very bad telephone line, pictures will download perfectly.

The system looked very impressive in pre-release testing and opens all kinds of obvious possibilities, like illustrating reviews, features and advertising. Unfortunately the system is available only for BBC users at present and there are no firm plans for other machines. From a technical standpoint, it seems that if there is sufficient interest, the Commodore 64 might be the next candidate for inclusion in the service but it would be very difficult to adapt software for the Sinclair Spectrum because of the way it handles graphics.

Novel service for the self-employed

Micronet has announced another novel service on Prestel, an online accounting service. It amounts to the user using a viewdata terminal as a means by which payments and receipts can be transmitted, via mailbox, to the accounting services firm MAS. As a result you receive periodical accounting breakdowns including audit and VAT reports, VAT records, bank transactions, breakdown and analysis of expenditure.

The feedback is in the form of hard copy in the post, ironically still preferred by accountants. A similar system was tried via Farmlink, a specialist Prestel information provider for farmers, with great success. The Micronet service, to be found in the BizzNet area – page 800511 – is aimed squarely at the self-employed and small businesses.

Chip-chat comms software

Amstrad CPC464 and 6128 models are already established comms vehicles driven by packages by SkyComm and Honeysoft, for example. But it is the big-brother business Amstrads, the PCW8256 and the newer 8512, which have been making headlines. Not only did the PCW machine win the Small Business Micro category of this year's Micro Awards but one of the very few coms packages available for it, the Sagesoft *Chit Chat*, also won its category.

Chit Chat, available initially for the IBM PC and Apricot machines, was adapted to the PCW8256 in February and Sagesoft already claimed 3,000 sales for its PCW version alone. Chit Chat is in two modules for scrolling terminals/electronic mail and also viewdata. Each module costs £69.99 inc. VAT. A badge-engineered Pace Nightingale modem is offered by Sagesoft in a complete package for £199.99 for modem plus a single module, or £239.99 with both modules. All you will need to get going apart from the package is the PCW £60 RS232 interface.

Another comms winner at the British Microcomputing Awards was the Miracle Technology WS3000 modem, one of the few medium-to-low-priced modems to gain BABT approval even though it features both CCIT and Bell tone standards.



Spectrum 128 problems

Despite what anyone might be claiming, the new Sinclair Spectrum 128 is not compatible with the VTX5000 modem and that is official. Some Spectrum, 128 users were finding that thre was about a one chance in 20 of the 128 and VTX powering-up in harmony, but Sinclair very quickly sold that anyone powering a Spectrum on and off repeatedly just to get a VTX working would invalidate the warranty and probably damage both the Spectrum and VTX in the process. So Spectrum 128 owners will have to wait for several interesting new projects round the corner.

Improved chat-line

By the time you read this, *Turbochat* should be up and running on Micronet 800. A hybrid of existing Daisy and Quickchat mainframe chat-lines, the new system features four on-screen auto updating message displays. Previously on quick-chats only one message was visible at a time and that usually was over-written very rapidly by the next. Now, one after another, each of the four simultaneiously-visible messages will be refreshed and that guarantees that your messge will be on display for more than just a few seconds,m something you would be lucky to attain with the old system.

In addition, 100 of the most recent messages will be archived, a feature of current Daisy-chats, of which there are now nearly 10 operating, with more planned. Mike Brown, Micronet technical director and originator of the chat-line is very enthusiastic about Turbochat and sees it as a step towards full viewdata conferencing on Prestel. As with current daisy-chats, messages will cost two pence to send and viewing is free.

ARIOLA IS FLY

Until *Skyfox* topped the charts last month, Ariolasoft was not exactly a name on every schoolboy's lips. Despite that, since its formation in September, 1984 it has managed to carve a niche for itself in the software market.

Marketing manager Frank Brunger obviously hopes the company can maintain the momentum created by Skyfox and has a pile of new programs waiting in the wings.

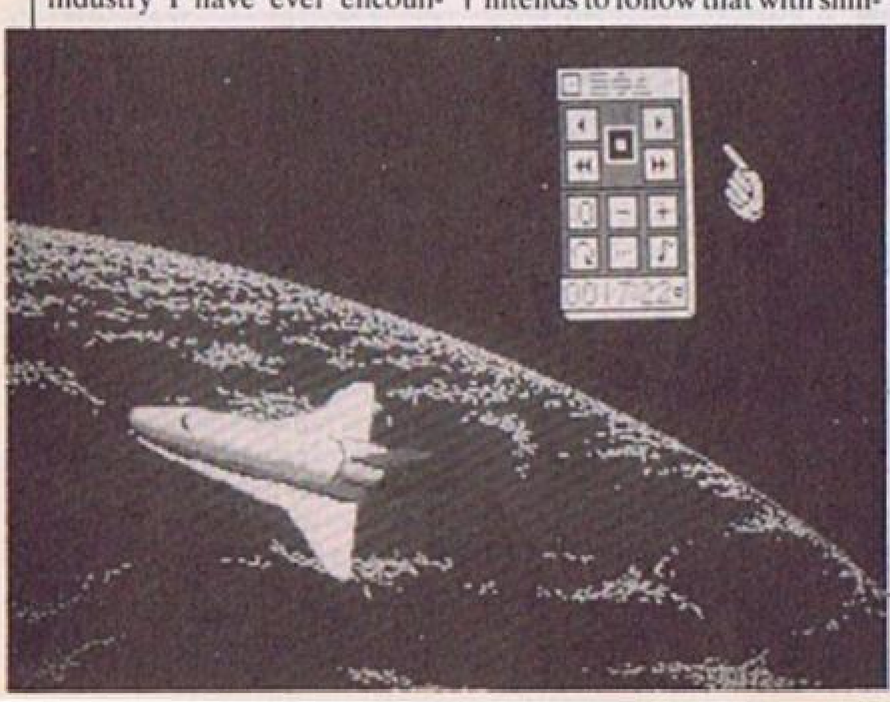
Esconsed in its new offices in the heart of London's trendy Covent Garden area, among the nouvelle cuisine restaurants and health centres, Ariola is planning to broaden its appeal both in terms of subject matter and machines covered. The offices were formerly occupied by Redwood Publishing, Chris Curry's ill-fated enterprise set up after he left Acorn. The only signs are a complete econet system, and the odd dog-eared copy of *Acorn User*.

Ariola started when Brunger and managing director Ashley Grey were working for the record company CBS. Both were working on the embryonic CBS software, with such memorable exploits as a Shakin' Stevens computer game. They were then approached by Bertelsmann GmbH, a German company with interests from Ariola records to Luxembourg Radio and magazine publishing.

Being from the big-time world of the record industry, Brunger has strong views on the world of software. "This is the worst, most unprofessional industry I have ever encountered. it is an absolute minefield for basically anyone," he says.

What he has set out to do is make Ariola intoi a catalogue-based company, like CBS and EMI. "We don't budget for big hits. You will never get a number one with a Country and Western record, yet they are still released. Likewise, you will never have a number one with a strategy game of any software for the Apple, but we release them, and we are doing very nicely, thank you."

With a pile of new releases every two weeks, Ariola has built an impressive catalogue in its first year and a half and it is all still available. So what has the company in store for the summer? In the games market, *Kaiser* and *Archon II*, two strategy games, are on the way. For arcade fans, *Golf Construction* re-creates the problems and pitfalls of that complex sport. On the adventure front, *Standing Stones* and *Terrors of Trantoss*, as well as the re-release of *Valkyrie 17* and *A Bard's Tale*, the latest in the Electronic Arts line of highly-regarded programs.



New markets

The company is also moving into the home productivity – or small business if you prefer – market. It has recently started to import the Batteries Included range of software and intends to follow that with similar products in a similar vein from such as *Calkit* and *Bgraph*, followed by *Printmaster* and *Newsroom*.

Three of the most startling products on the Ariola list are the De Luxe series for the Amiga computer. The company plans to launch the software to coincide with the U.K. launch of the machine. At £80 apiece, *De Luxe Paint*, *De Luxe Print* and *De Luxe Video* are scarcely the kind of products you will buy out of curiosity but if you have an application for such a program, this suite really represents the Rolls Royce of graphics.

Amiga software

De Luxe Paint is a fully WIMP-driven program which gives you access to all the Amiga 4,096 colours. There are the usual aids to creating curves, lines, shapes and textures, and there is also a very useful split screen zoom. That means you can work on a very small area of the picture very easily and still see the overall effect of your efforts on the whole picture. The results are very close to photographic quality and there are obvious professional applications.

De Luxe Print is designed for applications like business cards, letterheads and Christmas cards.

Finally, De Luxe Video allows real-time animation of characters, which can either be digitised, filmed or drawn using De Luxe Draw. You have a series of tracks, video and audio, which you can edit to determine the exact sequence of events.

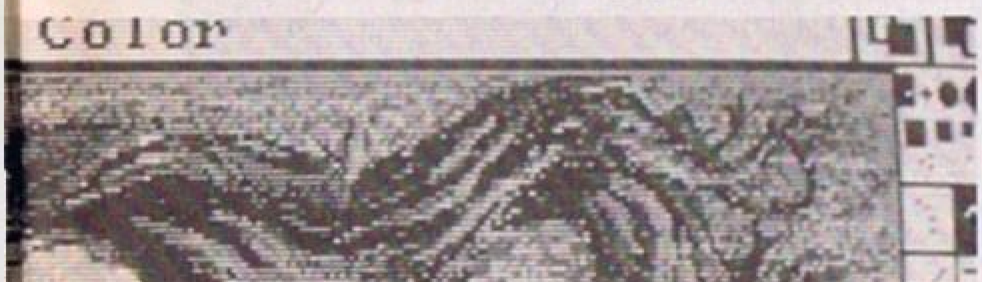
Terrors of Trantos is a new adventure from the Ramjam Corporation, whose first program, Valkyrie 17, a naughty Nazi spoof, Ariola is re-packaging and re-releasing, as it does not believe it did as well as it deserved. Terrors of Trandos is another text/graphic adventure in similar light-hearted style.

On the strategy front, Archon II is a follow-up to the cult arcade/strategy game Archon. It is a game on two levels, an abstract board on which decisions about strategy are made and, when battle is joined, an arcade arena in which the contestants fight to the death. The players move pieces round the board to try to control key squares. That



builds their energy and so allows them to cast more powerful spells on the enemy. Thus a stronger player quickly mops up a weaker player. So one

NG HIGH



mistake early in either strategy or tactics can quickly lead to disaster.

Still with strategy, Kaiser is an exceptional game, being a multi-player version of *King*, possibly one of the oldest ideas in computer games. If you outperform your rivals for the throne either in economics or on the battlefield, you could rise to unify Germany and become Kaiser.

In common with several other software houses, Ariola believes there is a so far underexploited market for home productivity programs. The first wave of such programs was from Batteries Included of Canada.

They included the usual word processing and database packages. Electronic Arts, one of Ariola's main stalwarts, has chipped-in with *Cut and Paste*, another word processor, this time aimed at the beginner market seeking menus and user friendly software. It even has error messages which say sorry. The manual is also written with the complete novice in mind.

Moving from that start, two programs, Calkit and Bygraph are planned. They work together. Calkit is a spreadsheet and Bygraph is designed to display the results obtained in various graphical formats. To start, all these programs will arrive in the American formats, i.e., Commodore, Apple and IBM.



Frank Brunger, Ariola's marketing manager.

Looking slightly further ahead, Newsroom, a program similar to the Mirrorsoft *Fleet Street Editor* is planned. According to Ariola, its product is a superior version with many extra features such as more flexible layouts and a communications package for transmitting completed documents.

All those specialist packages do not mean that the company has lost interest in hitting the top of the charts with an arcade game, it is just that a somewhat safer living can be made from serving specialist markets well.

After 18 months of explosive growth for the company, what now?

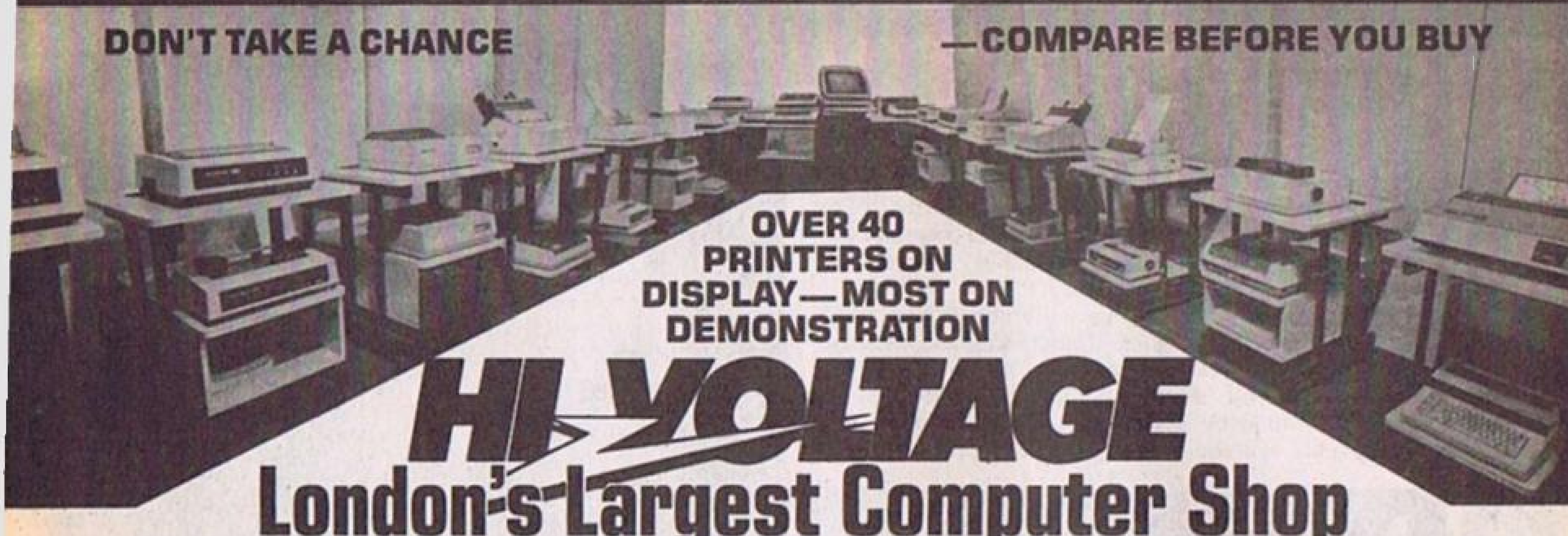
With licensing deals with no fewer than eight companies in the U.K. and the States, Ariola obviously will be a force to be reckoned with, both in terms of the number of products and quality. In particular, the deal with Electronic Arts ensures a steady supply of good software.

The future of the industry seems clear to Brunger. "I think it will become more like the record industry, with only a few bigt labels, probably around twelve. The need for wholesalers will disappear, as the smaller number of companies means that a retailer can deal direct with the marketing company. As that should result in a better feedback between customer and manufacturer, so the punter will get what he wants. At the moment, it is difficult to determine through the layers of wholesaler and retailer what is selling and why."

Naturally, Brunger also believes that Ariola has a big part to play in this sunny vision of the future.

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Acorn Computers – add-on buyer's guide

Acorn's financial difficulties, announced in early 1985, were less of a shock to those who had watched the micro industry from its beginnings than to the generation which knew the company only as the manufacturer of the computer most commonly to be found in the nation's schools.

Prior to the 1981 launch of the BBC model, Acorn spent time and money developing the Acorn Atom, an 8K ROM, 2K RAM, 6502 processor micro which sought to challenge the Nascom series and divert attention from the Sinclair ZX-81. The offer prices were aound £150 plus VAT for a ready-built version or about the same for the do-it-yourself kit. Unfortunately, Acorn emulated its Cambridge rivals in those days only by failing to deliver mail-ordered computers in the promised time and the Atom never really figured as a major contributor to the home micro scene.

From the beginning, Acorn gave the impression of a company too busy with ideas to sell anything and Sinclair's much-publicised resentment of the Micro Electronics Programme contract which Acorn landed was at least understandable. Sinclair had pioneered micros for all, Acorn had failed to market its products, and yet it was to Curry and Hauser that the BBC went for the micro which was so readily adopted by the Government's scheme.

Sales and a stable price for the machine were assured but when the MEP ended in 1985, Acorn had nothing new to offer. Despite four years of a ready market and a large research and development department, the foremost prestigious maker of micros to the nation's youth was forced to accept not one, but two, rescue deals which gave control of the company to the Italian Olivetti typewriting empire.

Rumours of new developments abounded, but when the long-awaited Master series was finally launched in the wake of Olivetti's tough reorganisation, it proved to be not much more than a 32-bit version of the BBC model B and, as such, scarcely worth the wait. Further, there are still no disc drives as an integral part of the cost, which is high, and the series is unlikely to live up to the makers' claim that "it is the yardstick by which all microcomputers will be judged throughout the second half of the 1980s."

Depressingly, it seems that the new-look Acorn will continue to rest of the laurels sown for it years ago by the patronage of the BBC and the MEP and that genuine innovation will remain the province of companies with less establishment clout.

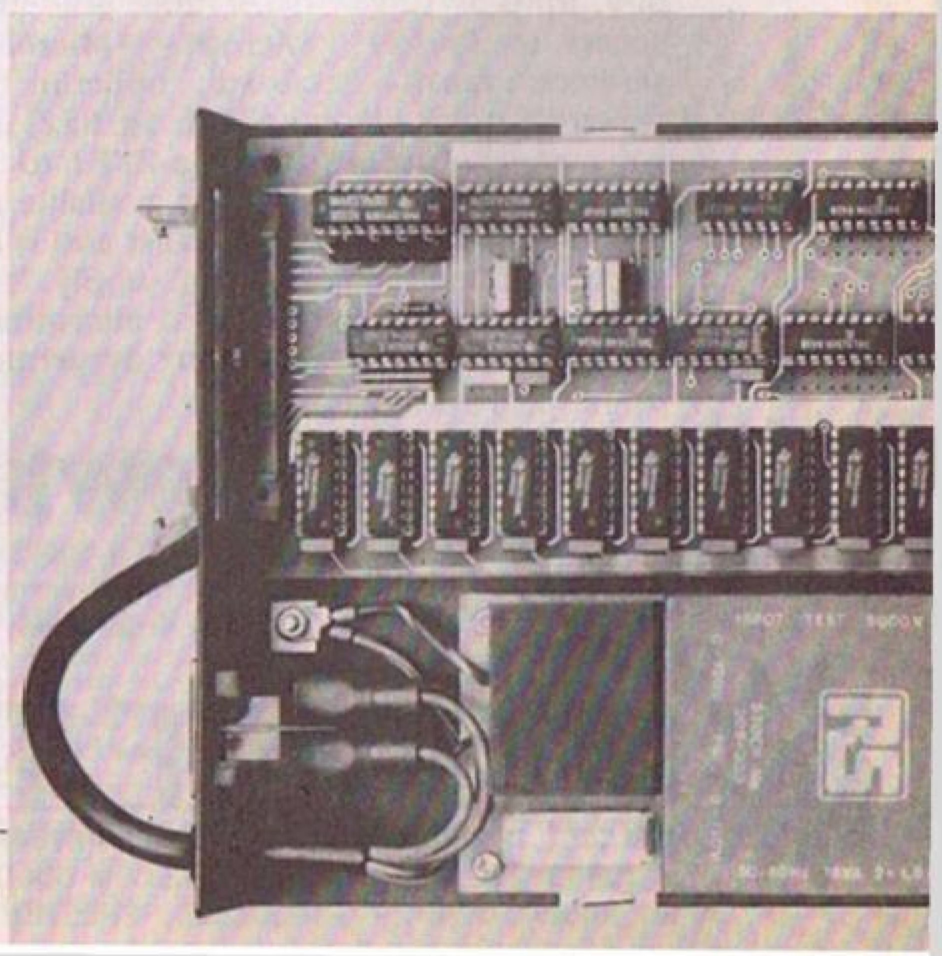
Nevertheless, the BBC micro was and is a good one, much-loved by those who own it and capable of arousing fierce and partisan opinions. It is also magnificently served by a peripherals industry which has produced some of the best hardware and software support devised for a British computer. As a result, whatever happens to the company, there is little doubt that its product will prove greater and more durable than its makers may have deserved.

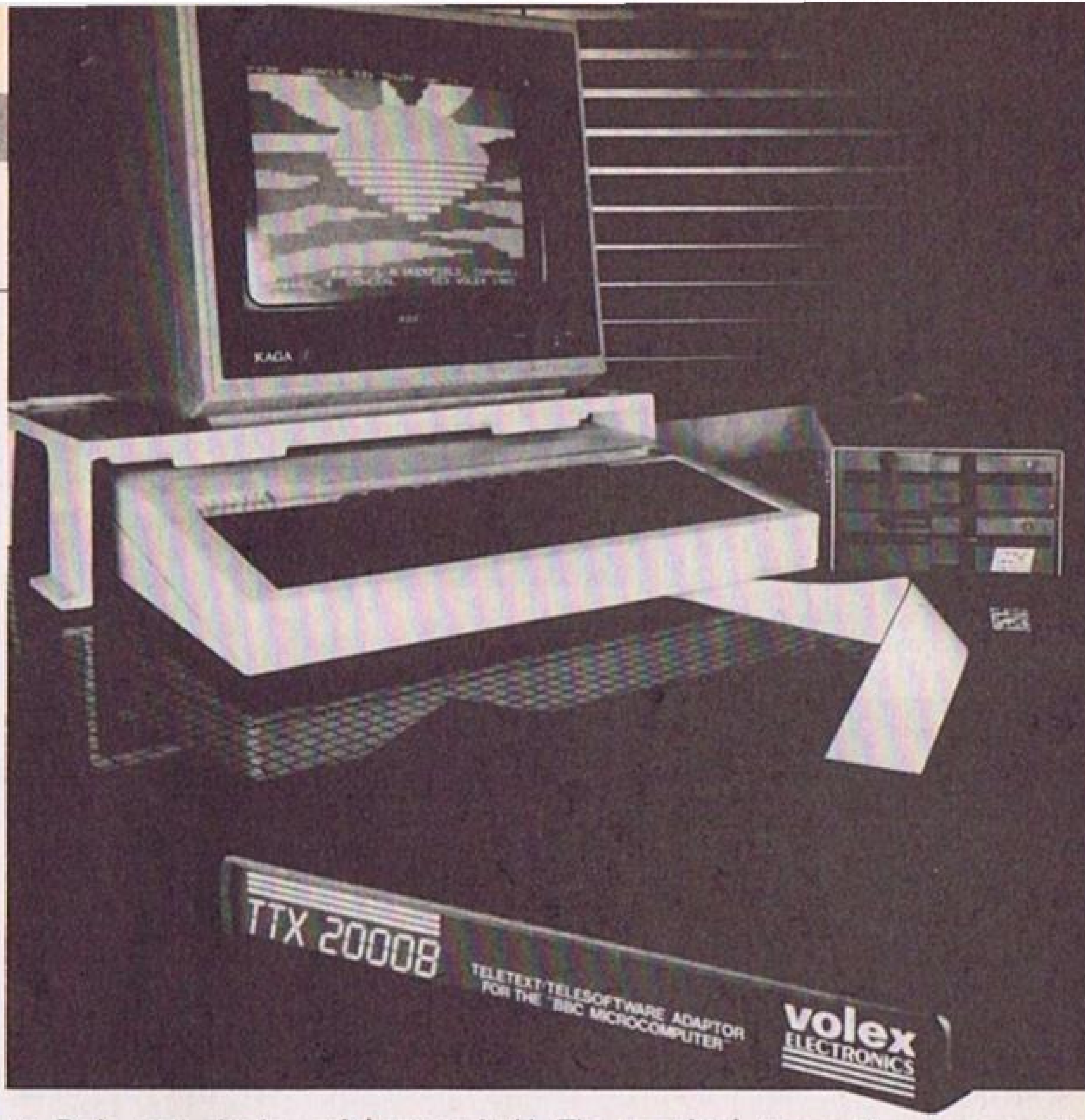
The BBC micro has a peripherals industry which flourishes year in, year out. There are many varied and interesting reasons, stemming from the good design points – 1MHz bus, Tube and I/O sockets; its bad points – lack of RAM, mediocre disc system; and taking in on the way its education image – plenty of I/O peripherals needed in this department – and the dedication and spending power of BBC microcomputer owners; they were not going to consign their micros to the cupboard under the stairs.

BBC peripherals can be found in profusion in the general buying guide on I/O devices elsewhere in this issue but there are still goodies you can buy for this computer which either are not available yet for other computers, or which are more comprehensive and have higher screen resolution when used on the BBC system.

A good case in point is EV1, or Snap, the world's first affordable solid-state camera for a home micro. It is fun, it is useful, it is educational, it is inexpensive. On the Commodore 64 you do not get the same fast disc access or the same finely-detailed pictures on the screen.

Then there's Teletext and Prestel. As more computers acquire modems, they can tap into the BT Prestel service; the advantage of the BBC computer is that it has a screen mode geared specifically to displaying the Prestel characters and colours. Teletext, the free service with its similar screen layout, is captured from the BBC and Independant Broadcasting Authorities' Ceefax and Oracle services and not the kind of thing most computers support. Morley Electronics will be happy to sell you a Teletext Adaptor. Prestel reception requires a modem and some software, usually in ROM.





Sideways ROM software, which is available instantly without any load time, is a blessing for those BBC owners – if there are any – who have only a cassette filling system. It is useful for everyone else, too. Boards range from small but useful internal piggy-back PCBs – Acorn User, Pear Tree – surface-mounted sockets and cartridges – Viglen – and more substantial internal additions – the latest Solidisk offering is a 224K sideways ROM configuration.

The list of firmware which can be fitted on the ROM boards is seemingly endless. Top of any shopping list will probably be a word processor – Wordwise or View – followed closely by printer-handling ROMs. Enter the Watford triplets – the NLQ ROM whjich turns the standard Epson RX80/FX80 into a near letter quality printer; the BBC printer ROM, which makes using a printer from Wordwise or Basic very simple; and Dumpout3, which produces hard copy of any BBC screen mode to dot matrix printers.

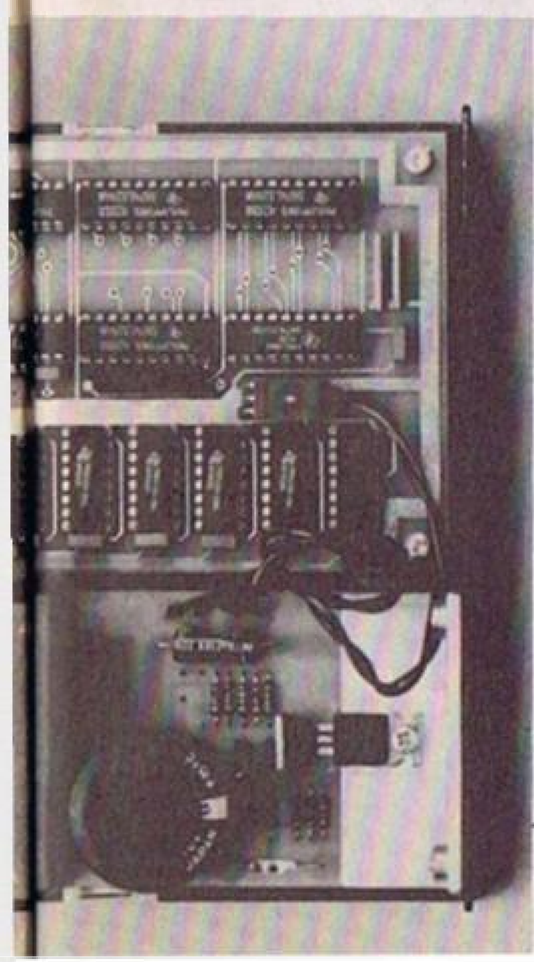
Serious programmers are well catered for with the Romas cross-assembler, the Beebmon monitor, and high-level languages such as Logo, Forth and the just-released Microprolog. On the serious-use/entertainment borderline there is the renowned AMX mouse and the attendant WIMP – windows, icons, menus and pointers – software. Beebugsoft offers a large range of ROMs, including IconMaster – icons for your own Basic programs – and Romit, which helps you to put your software inside sideways ROM – or into battery-backed sideways RAM – and Toolkit, a Basic programmers' aid. The magazine creators Fleet Street Editor (Mirrorsoft) and Pagemaker (AMS) are also in this category.

After sideways ROM there is extra RAM. Some of it fits sideways, some of it fits on to the 1MHz bus. Some has a ni-cad batteryt to make sure it does not lose its memory when the computer is switched off – battery-backed CMOS RAM – and some spends its time thinking its an extra disc drive – Silicon disc RAM. The extra RAM can usually be used as extra screen storage, data storage, or to act as a print spooler so that useful task, background printing, may be carried-out.

If you have fitted your BBC computer with extra memory, you may want to buy a disc drive or, if you have one of the early low-capacity drives (100K), you may want to upgrade to faster, more capacious models. For first-time buyers, the 3.5in. drives are an attractive choice. With a double-density disc filling system ROM fitted on the main PCB, the 3.5in. drives give 400K of storage capacity and they are very fast.

You may pay a little extra for any software you buy, though, *if you want it supplied in 3.5in.* format. Standard 5.25in. drives, such as those obtainable from Watford or Technomatic, have come a long way since 1981 and a dual 40-track-80-track drive can be bought for the same price as a 3.5in. drive – around £60-£200. These dual drives are the obvious choice for users upgrading their systems; they can run their old 40-track discs and benefit from the extra capacity which 80 tracks give (400K).

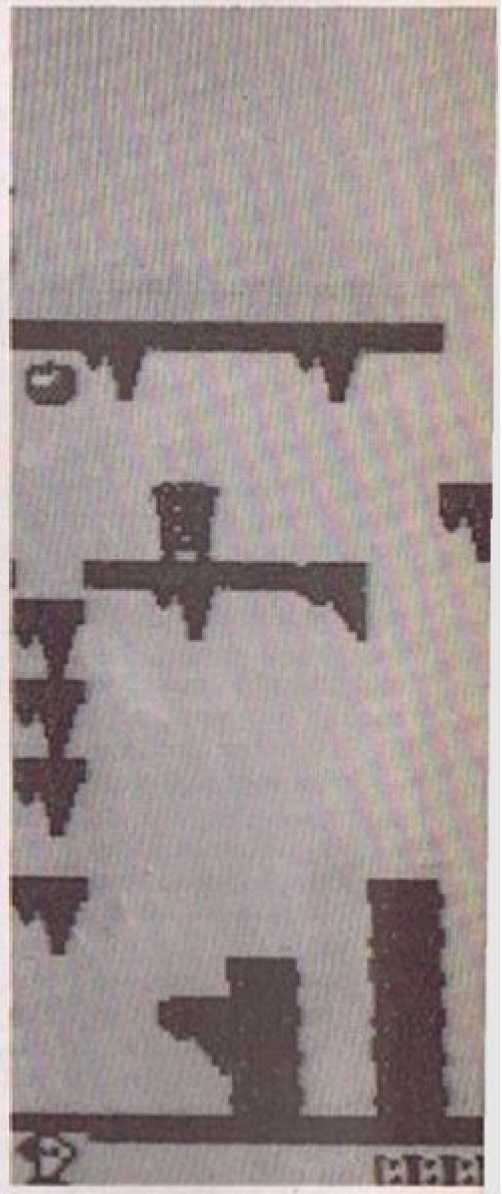
In general terms, if you want a particular – or peculiar – peripheral for your computer, there is likely to be one for the BBC. A bar-code reader, a real-time clock, a robot buggy, a satellite weather picture receiver. BBC owners are alsmost spoilt for choice.



Pictured (left) an external 256K memory up-grade for the BBC model B computer.

Teletext	● Morley Electronics 091 251 3883 ● Volex Electronics 061 736 5822	**Sideways RAM**	● Aries Computers 0223 862614 ● Solidisk 0702 354674 ● Watford Electronics 0923 37774
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BBC software – high quality makes up for lack of wide choice



That the Acorn software lacks in choice, it more than compensates for in quality. Despite its age, the BBC has not attracted the same kind of following among software houses that its contemporaries, the Commodore and Spectrum, have acquired.

Don't despair. Most of the titles are labours of love by people who specialise in the machine and no other. For many of them, money has been no object and the results stunning.

There are, of course, several versions of the machine and it is difficult to be definitive about what programs will or will not work. Be careful with disc-based games for the BBC Plus and Master series. Those machines use a new disc controller chip which produces all kinds of problems. All programs will run on a basic BBC B model.

In the early days of the machine, Acornsoft provided a valuable channel between writer and public. Among the earliest classics was *Asteroids*. If you were utterly hooked on the arcade game, it was such a good copy you would probably save money by buying a BBC just to play this game. It had all the features of the arcade machine, including the feel of the real McCoy.

Acorn hits

Another Acornsoft hit was *Zalaga*. A simple arcade shoot-'em-up, all sound and fury, one of the best. Even three years after its launch, when one fires up the rather dog-eared copy in the office, one is still guaranteed to bring magazine production to a standstill. It is a copy of the arcade classic *Galaxians* and loses none of the speed, noise and colour of the original.

If you like your violence to have slightly cerebral overtones, *Elite,* again from Acornsoft, could be for you. While early versions were notoriously bugged, it remains the classic game for the machine. For the true afficianado, there is even a second-processor version which is faster, bigger and better. You start as a pauper with a bucket of a ship. Can you, with a blend of strategy, trading, and blasting, join the immortals in the order of the Elite?

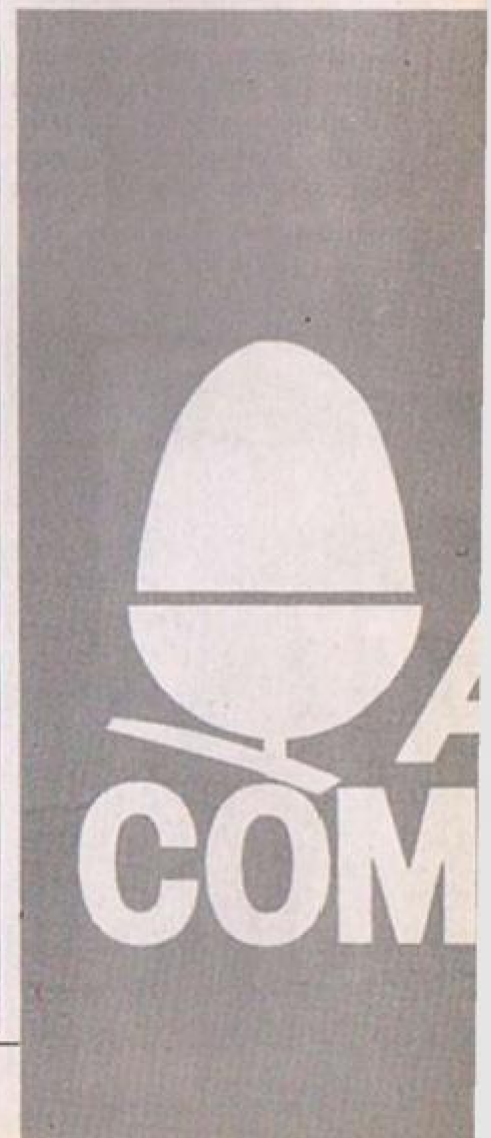
Exploding Fist, despite a wave of immitators, remains the benchmark among beat-'em-ups. The blend of reflexes, timing and out-psyching your opponent makes this a game you will return to time and again.

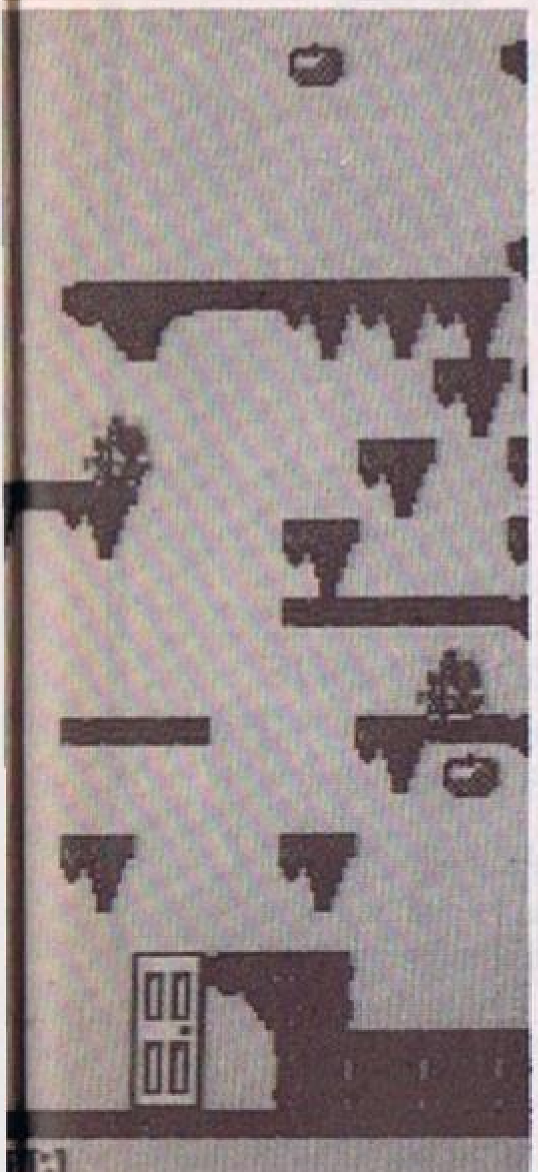
If simulators are your speciality, two programs you should watch for are *Aviator* and *Revs* from Acornsoft. Aviator puts you in the pilot's seat of a Spitfire. Wire frame graphics and relaistic handling put it among the immortals. The black-and-white graphics are a little disappointing and the lack of the Hun a let-down, but the feel of the aircraft, something missing from most rival products, is what marks this one. About the only thing you get to shoot are strange aliens which are trying to invade Acornsville. Oh, well, ground strafing is better than nothing.

Revs probably gets most people's vote for a demonstration of all-round virtuosity. The game is a simulation of a Formula 3 racing car going round Silverstone. It leaves every other racing simulator back on the grid with a dead engine. Everything from the nose rising and dipping as you accelerate and brake, realistic skid control, three levels of tough opposition, everything you could want. Most people have the "boy racer" urge, so if everyone managed to work out their frustrations on this program instead of the M25 in the middle of the rush hour, it could be a major contribution to road safety.

The view out is in full 3D, with the opposing cars given full perspective The opposition, especially on "pro" level, is very good, and if you are not good enough, you will find yourself rammed from behind and deposited in the catch fencing. It even teaches you skid control and cadence braking – useful lessons for the open road.

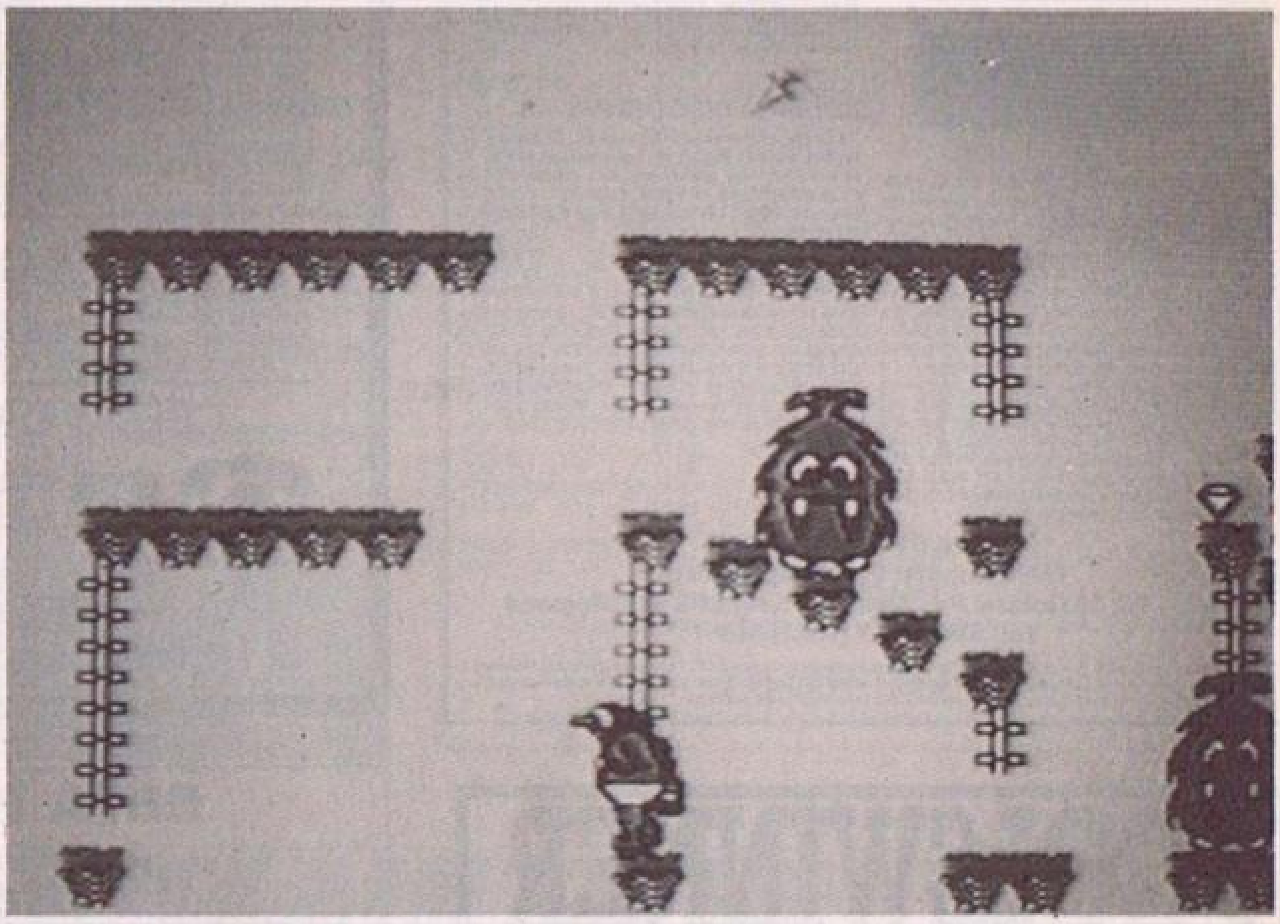
Arcade adventures are fairly plentiful on the BBC. *Castle Quest,* from Micropower, has pleasant graphics and many intriguing puzzles. The RSPCA might not like the solution to the spider problem – feed it a monkey or two – but the combination of dexterity, timing and logic needed to

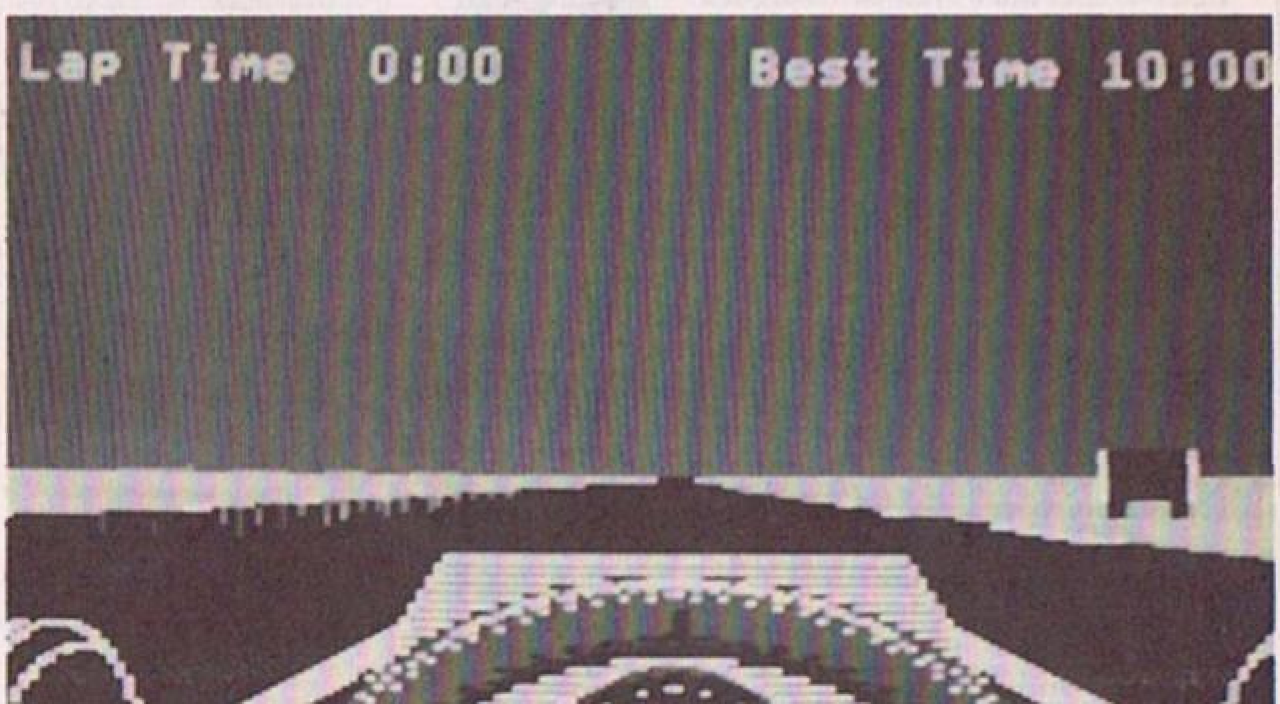




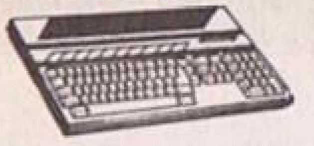
solve the puzzles should keep fans happy for hours.

Also worthy of mention in this genre are the two Ultimate classics, *Alien 8* and *Knight Lore*. Once again, these 3D adventures spawned a thousand imitators but the originals were superb. Also worthy of mention is *Contraption* from Audiogenic. A simple platform game, but the screens are irritatingly difficult, as well as being colourful and amusing. So, ten of the best, without which no owner can consider his collection complete. Age cannot wither them, nor custom stale their infinite variety.





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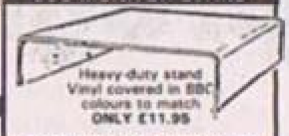
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Mastering Spec
programming t

The 128K Spectrum's manual makes scant mention of how the computer's extra memory may be called into action. Dick Sargent makes up for this with three programs that will help you to use the extra memory.

The Spectrum 128 is basically a Spectrum+ with 64K of extra memory, an RS232 port and an AY-3-8912 sound chip bolted on to it. Having paid for those extras, you might like to use them immediately instead of waiting for some software company to incorporate them into their latest software offerings.

Problem one. The Sinclair documentation supplied with the machine is now very disappointing. Spectrum 16K and 48K owners will remember with affection the ring-bound Basic Programming Manual which had 232 pages. Dorling Kindersley was commissioned to produce the colour manual for the Spectrum+ and the information has taken a Quantum Leap – backwards. For the 128, there is a 14-page colour supplement which, like the hardware, is tacked on to the Spectrum+. In the next few issues of *Your Computer,* we will be looking at aspects of the 128 which call for a detailed – usually machine-code – understanding of the machine.

Manual over-ride

The Spectrum 128 contains 32K of ROM and 128K of RAM arranged as 10 16K pages. The burning question is, of course, where can all those pages be found? The 16K Basic ROM or the 16K Editor ROM must appear at 0000-3FFF and any one of the eight RAM pages must appear at C000-FFFF at all times, but that leaves addresses 4000-BFFF unaccounted for. In practice, RAM-P5 can be diverted to 4000-7FFF and RAM-P2 can be diverted to 8000-BFFF, and that is what happens at switch-on time. I cannot think of a situation when P5 and P2 would need to be moved away from those central addresses but there may be one. When a Basic or machine-code program is running, RAM-P0 takes the top slot (C000-FFFF) and when a the Ready prompt is on, or a program is being written or edited, RAM-P7 takes the top slot.

RAM-P5, P2 and RAM-P0 act like normal Spectrum 48/Spectrum-Plus memory blocks and are best left alone. RAM-P5 holds the normal Spectrum screen, bit-mapped from 4000-57FF and the attribute bytes from 5800-5AFF. That is the normal 128 screen, too, but it is called screen 0 because a second screen (screen1) can operate at address C000 in RAM-P7 when the Editor ROM is not looking.

The silicon disc

The system software does not support the use of this second hardware-screen-base, C000, but it can be accessed by machine code programs. RAM-P7 is also used as Editor workspace and as a store for the Editor image of all the characters currently being viewed and/or edited on screen 0. When the Editor comes into use, any screen occupying C000 will be destroyed, so RAM-P7 is said to be "contended" – i.e., two separate items may want to make use of it.

RAM-P1,P3,P4 and P6 are seen by the 128 operating system as a 64K silicon disc. Those pages can store any data which would be acceptable to the Spectrum cassette channel and their use from Basic is by the commands SAVE!"name" and LOAD!"name". Unlike tape operations, a directory of names is held in RAM-P7. Strangely, RAM-P4 and RAM-P6 are labelled contended by Sinclair but it is not clear why; RAM-P1 and RAM-P3 are uncontended. The Channel method of communication may be by-passed in machine code, allowing instant access to that 64K block. The really sad news is that the silicon disc is erased when the 128 re-set button is pressed.

If you have the excellent Spectre-Mac-Mon from Oasis, you can load it into the 128 mode and disassemble blocks of code directly to a printer. I used the official 128/QL printer lead and a Brother EP44 serial printer. Lowering the baud rate to 1,200 at the Spectrum end of the lead proved to be a teaser; adjusting the baud rate is one of many topics conveniently ignored in the manual.

For the record, POKE 23391,110 seems to do the trick. The 128 cannot run the ZX printer or any printer, or indeed any software which uses the print buffer RAM, 5B00-5BFF. That area is used for ROM-switching software, storage for the new Editor ROM and for a second machine stack.

A quick look at the ROMs reveals that it is "business as usual" in the Sinclair software-writing department. Bytes at 386E-3CFF which were unused originally now hold the scanning routines and translation tables for the new keypad. Very little has changed, of course, because the original ROM is still needed to run 48K programs, but I cannot help feeling that it is about time the non-maskable interrupt bug was put right and the 24 bytes of ZX-81 code (at 04AA) removed.

Extra Goodies

The Editor ROM holds all the extra goodies – whole-screen editing; silicon disc access; RS232 software emulation, including Midi; light-channel sound; calculator and tape tester. In 128 mode, after a program has run once, the familiar Spectrum message "0 OK, 1000:1", or similar, appears on the screen. If you then type "run" at any speed faster than a snail's pace, the system misses the "r" and puts "un" on the screen, together with a message which reads "Variable not found, 0:1" What is happening is that the system is giving you a program listing and is so busy doing that task that the "r" of run is not detected. The Editor is fast – program lines can be entered and altered at normal typing speed – but why did someone at Sinclair allow the Editor to give a LIST immediately before a RUN?

Program 1

```
                        ;FOR THE SPECTRUM 128
                        ;R.SARGENT MARCH 86
                        ;
                        ;MOVE CONTENTS OF EDITOR ROM
                        ;TO 0000-BFFF

7F00  (7F00)                    ORG    &7F00

                        ;32512d
7F00  F3                 PROG1  DI
7F01  F5                        PUSH   AF
7F02  E5                        PUSH   HL
7F03  D5                        PUSH   DE
7F04  C5                        PUSH   BC
7F05  3A 5C 5B                  LD     A,(&5B5C)
7F08  E6 EF                     AND    &EF
7F0A  01 FD 7F                  LD     BC,&7FFD
7F0D  ED 79                     OUT    (C),A
7F0F  21 00 00                  LD     HL,0
7F12  11 00 80                  LD     DE,&8000
7F15  01 00 40                  LD     BC,&4000
7F18  ED B0                     LDIR
7F1A  3A 5C 5B                  LD     A,(&5B5C)
7F1D  01 FD 7F                  LD     BC,&7FFD
7F20  ED 79                     OUT    (C),A
7F22  C1                        POP    BC
7F23  D1                        POP    DE
7F24  E1                        POP    HL
7F25  F1                        POP    AF
7F26  FB                        EI
7F27  C9                        RET
```



trum 128K echniques

The address of the banked RAM and ROM is controlled by a ULA chip and pages may be switched in and out of memory-map slots by flipping bits in a control register. That register, the Page-Register, is controlled by the Sinclair

A not-very-useful but quick example of setting this register from Basic is OUT 32765,BIN 00110000, which, when typed into a mode 128 Spectrum, causes the machine to re-set itself into 48K mode.

More sensible effects can be obtained in machine code but it is essential to know the current contents of the Page-Register, since it might prove fatal to disturb the setting of some of the bits in that register. The variable BANKM at 5B5C holds a copy of the last byte output to the Page-Register and it should be consulted before sending a new byte to the register.

Program one copies the contents of the Editor ROM into RAM at 8000-BFFF, from whence it can be saved to tape and then disassembled by those of curious disposition using a proprietary 128 or 48K Spectrum monitor/disassembler. Use RANDOMIZE USR 32512 to run the program.

Program two copies data between 8000-BFFF to and

Program three illustrates how the alternate screen is brought into action. RANDOMIZE USR 32658 does the trick in this case and the program borrows some code from program two to keep down the overall length.

Moving RAM PAGES round experimentally can result in disastrous crashes and one likely cause is when a subroutine tries to find its

Program 2

```
                ;FOR THE SPECTRUM 128
                ;R.SARGENT MARCH 86
                ;
                ;INTERCHANGE CONTENTS OF
                ;8000-BFFF (RAM-P5)
                ;WITH RAM-PAGES 1, 3, 4, 6.

                ;32552d
7F28  F3         PROG2A  DI
7F29  21 00 80           LD    HL,&8000
7F2C  18 04              JR    MS

                ;32561d
7F2E  F3         PROG2B  DI
7F2F  21 00 40           LD    HL,&4000
7F32  22 8C 7F   MS      LD    (BASEAD),HL
7F35  21 00 40           LD    HL,&4000
7F38  22 90 7F           LD    (COUNT),HL
7F3B  CD 40 7F           CALL  MSH
7F3E  FB                 EI
7F3F  C9                 RET

7F40  F5         MSH     PUSH  AF
7F41  E5                 PUSH  HL
7F42  D5                 PUSH  DE
7F43  C5                 PUSH  BC
7F44  21 8B 7F           LD    HL,PNUM
7F47  7E                 LD    A,(HL)
7F48  E6 07              AND   7
7F4A  FE 00              CP    0
7F4C  28 2F              JR    Z,EXIT
7F4E  FE 02              CP    2
7F50  28 2B              JR    Z,EXIT
7F52  FE 05              CP    5
7F54  28 27              JR    Z,EXIT
7F56  4F                 LD    C,A
7F57  3A 5C 5B           LD    A,(&5B5C)
7F5A  E6 F8              AND   &F8
7F5C  B1                 OR    C

7F5D  32 8E 7F           LD    (RNTP),A
7F60  01 FD 7F           LD    BC,&7FFD
7F63  ED 79              OUT   (C),A
7F65  CB 7E              BIT   7,(HL)
7F67  28 19              JR    Z,TOPAGE
7F69  2A 8C 7F   FROMP   LD    HL,(BASEAD)
7F6C  11 00 C0           LD    DE,&C000
7F6F  ED 4B 90 7F MOVEIT LD    BC,(COUNT)
7F73  ED B0              LDIR
7F75  3A 5C 5B           LD    A,(&5B5C)
7F78  01 FD 7F           LD    BC,&7FFD
7F7B  ED 79              OUT   (C),A

7F7D  C1         EXIT    POP   BC
7F7E  D1                 POP   DE
7F7F  E1                 POP   HL
7F80  F1                 POP   AF
7F81  C9         MKER    RET

7F82  21 00 C0   TOPAGE  LD    HL,&C000
7F85  ED 5B 8C 7F        LD    DE,(BASEAD)
7F89  18 E4              JR    MOVEIT

                ;32651d
7F8B  00         PNUM    DB    0
                ;PNUM the hi-mem page involved
                ;BIT 7   1   base --> hi-mem
                ;BIT 7   0   hi-mem --> base
7F8C  00 00      BASEAD  DW    0
                ;BASE-ADDRESS 8000 or 4000
7F8E  00 00      RNTP    DW    0
                ;NUMBER BYTES TO MOVE
7F90  00 00      COUNT   DW    0
```

unused port address A1 LOW, in conjunction with lines A15 and A14. All other address lines should be kept at logic 1, giving a full 16-bit address of 7FFD (32765). The register is mapped as a Z-80 port and can be accessed by the Z-80 machine-code instruction OUT (C),A. Toggling the bits in this register selects the various memory patterns.

There are three programs this month to illustrate the use of the Page-Register. They should be entered using an assembler or monitor and you can do it in 48K mode provided you then save the complete code to tape (SAVE "progs"CODE 32512,216), and then load it back into the 128 mode. All three programs should be run in 128 mode.

from any one of RAM-PAGES 1,3,4 and 6. The page number is first entered into 7F8B (32651), and then RANDOMIZE USR 32552 moves the bytes. The direction of movement is from the page in question to the 8000 block if the number is 1,3,4 or 6 and from the 8000 block to the page in question if the number has 80H (128) added to it.

return address from a stack-location in RAM-P0 when RAM-P0 is no longer active. Therefore it is prudent to check carefully the position of PUSH/POP and CALL/RET instructions in the code to make sure that they will work properly. Interrupts should be disabled, since they, too, require the constant presence of RAM-P0.

```
                ;FOR THE SPECTRUM 128
                ;R.SARGENT MARCH 86
                ;
                ;SELECT SCREEN-1 (IN RAM-P7)
                ;AS CURRENT SCREEN

                ;32658d
7F92  F3         PROG3   DI
                ;FIRST USE SUBROUTINE
                ;MSH TO MOVE SCREEN
                ;CONTENTS TO RAM-P7

7F93  3E 87              LD    A,&87
7F95  32 8B 7F           LD    (PNUM),A
7F98  21 00 40           LD    HL,&4000
7F9B  22 8C 7F           LD    (BASEAD),HL
7F9E  21 00 18           LD    HL,&1800
7FA1  22 90 7F           LD    (COUNT),HL
7FA4  CD 40 7F           CALL  MSH

                ;COPY OF SCREEN-0 NOW IN
                ;RAM-P7
                ;A RETURN TO BASIC WOULD
                ;INVOKE THE EDITOR AND SO
                ;OVERWRITE RAM-P7
                ;THEREFORE...

                ;CLEAR SCREEN-0 IN MACHINE
                ;CODE
                ;(LEAVING ATTRIBUTES ALONE)
7FA7  21 00 40           LD    HL,&4000
7FAA  36 00              LD    (HL),0
7FAC  11 01 40           LD    DE,&4001
7FAF  01 FF 17           LD    BC,&17FF
7FB2  ED B0              LDIR

                ;SCREEN-0 THUS GOES BLANK
                ;BUT ONLY FOR A FRACTION
                ;OF A SECOND, BECAUSE
                ;SCREEN-1 TAKES OVER
                ;IMMEDIATELY....

                ;PICK UP MASK FOR RAM-P7
                ;FROM RNTP TO SAVE CODE

                ;AND MAKE RAM-P7 THE CURRENT
                ;HI-MEM PAGE

7FB4  3A 8E 7F           LD    A,(RNTP)
7FB7  01 FD 7F           LD    BC,&7FFD
7FBA  ED 79              OUT   (C),A
                ;RAM-P7 NOW ACTIVE
                ;NOW SELECT SCREEN-1
7FBC  F6 08              OR    8
7FBE  ED 79              OUT   (C),A
                ;SCREEN-1 IS NOW SHOWING
                ;WHATEVER IT RECEIVED FROM
                ;&4000 BEFORE THE LDIR
                ;CODE WIPED &4000 CLEAN

                ;A SHORT DELAY
7FC0  06 20              LD    B,&20
7FC2  0E FF      L1      LD    C,&FF
7FC4  3E FF      L2      LD    A,&FF
7FC6  3D         L3      DEC   A
7FC7  20 FD              JR    NZ,L3
7FC9  0D                 DEC   C
7FCA  20 F8              JR    NZ,L2
7FCC  10 F4              DJNZ  L1

                ;RETURN SYSTEM TO NORMAL
                ;SCREEN-0 NOW IN USE
                ;IT IS BLANK BECAUSE IT
                ;WAS WIPED BY THE LDIR

7FCE  3A 5C 5B           LD    A,(&5B5C)
7FD1  01 FD 7F           LD    BC,&7FFD
7FD4  ED 79              OUT   (C),A
7FD6  FB                 EI
7FD7  C9                 RET

                ;00D8 216d long

7FD8  (7FD8)             END

e: 00000  Warnings: 00000
```

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Tasprint	Tasman	£17.95
Decision Maker	Tryptych	£35.95R
Entrepreneur	Tryptych	£35.95
Project Planner	Tryptych	£35.95
QL Fictionary	Whoopee	£11.65

PCW 8256

Combo: Stock, Invoicing, Sales	Amsoft	£103.49
Nominal Ledger	Amsoft	£41.39
Purchase Ledger	Amsoft	£41.39
Brain Storm	Caxton	£45.00
Cardbox	Caxton	£90.00
Scratchpad Plus	Caxton	£62.95
Smart key	Caxton	£45.00
Touch 'n' Go	Caxton	£22.50
Accounts (Nom/Purch/Sales/Invs)	Compact	£179.95
Daybook	Compact	£45.00
Nominal Ledger	Compact	£62.95
Nucleus (2nd Drive Reqd.)	Compact	£89.95
Payroll (2nd Drive Reqd.)	Compact	£89.95
Purchase Ledger	Compact	£62.95
Sales & Invoicing	Compact	£62.95
Stock Control	Compact	£62.95
Clock Chess 3D	CP Software	£17.95
C Compiler	Digital	£45.00
DR Draw	Digital	£45.00
DR Graph	Digital	£45.00
Pascal MT/+	Digital	£45.00
Personal Assistant	FMP	£35.00
Devpac80	Hisoft	£35.95
Pascal80	Hisoft	£35.95
Pocket Wordstar	Micropro	
Accountant Plus	Sage	£135.00
Chit Chat	Sage	£63.00
Chit Chat Combo	Sage	£90.00
Database	Sage	£63.00
Invoicing	Sage	£63.00
Popular Accounts	Sage	£89.00
Popular Payroll	Sage	£89.00
Popular Accounts/Payroll	Sage	£135.00
Supercombo	Sage	£180.00
Supercalc 2	Sorcim	£45.00

SPECTRUM

Title	Company	
Beta Basic 3.0	Betasoft	£13.50
Masterfile	Campbell	£13.50
Materfile & MF Print	Campbell	£18.00
Astronomer III	CP Software	£8.95
Floating Point Forth	CP Software	£9.95
Supercode III	CP Software	£11.65
Mini Office	Database	£5.35
The Illustrator	Gilsoft	£13.50
The Quill	Gilsoft	£13.50
C Compiler	Hisoft	£22.50
Dev Pac 3	Hisoft	£12.50
Pascal	Hisoft	£22.50
Ultrakit	Hisoft	£8.50
Omnicalc 2	Microsphere	£13.50
Machine Code Tutor	New Generation	£13.50
Lightmaniac	New Generation	£13.50
Address Manager Standard	OCP	£8.05
Address Manager Plus 80	OCP	£17.95
Editor Assembler	OCP	£11.65
Finance Manager Standard	OCP	£8.05
Finance Manager Plus 80	OCP	£17.95
Machine Code Test Tool	OCP	£8.95
Stock Manager Standard	OCP	£8.05
Stock Manager Plus 80	OCP	£17.95
VAT Manager Standard	OCP	£8.05
VAT Manager Plus 80	OCP	£17.95
Editor & Assembler	Picturesque	£7.85
Spectrum Monitor	Picturesque	£6.75
Paint Plus	Print 'n Plotter	£8.95
Screen Machine	Print 'n Plotter	£7.40
Trans Express (cass)	Romantic	£8.95
Trans Express (m/d)	Romantic	£9.95
Make A Chip	Sinclair	£5
Small Business Accounts	Sinclair	£6.50
VU Calc	Sinclair	£4.50
VU 3D	Sinclair	£4.50
ZX Forth	Sinclair	£7.50
Tascopy	Tasman	£8.90
Tasmerge	Tasman	£9.80
Tasprint	Tasman	£8.90
Taswide	Tasman	£4.95
Tasword II	Tasman	£12.50
The Artist	Softek	£11.65
Blast (Compiler)	Oxford	£22.50

AMSTRAD 464/6128

Title	Company	
Basic Tutorial 4	Amsoft	£17.95
Complete Firmware	Amsoft	£17.95
Complete OS	Amsoft	£22.50
Decision Maker	Amsoft	£22.50
Pascal 80	Hisoft	£35.95
Guide to Basic 1	Amsoft	£17.95
Guide to Basic 2	Amsoft	£17.95
Dev Pac 80	Hisoft	£31.50
Project Planner	Amsoft	£22.50
Screen Designer	Amsoft	£13.50
Star Watcher	Amsoft	£17.95
Mastercalc CPC464	Campbell	£22.50
Masterfile CPC464	Campbell	£22.50
Artist & Sprite Designer.	CRL	£8.05
Mini Office	Database	£5.35
Masterfile 664 (D)	Campbell	£27.00
Devpac	Hisoft	£22.50
Font 464	Hisoft	£7.15
Pascal	Hisoft	£22.50
Machine Code Tutor	New Generation	£13.50
Code Machine	Picturesque	£17.95
Tascopy 464	Tasman	£8.90
Tasprint 464	Tasman	£8.90
Tasword 464	Tasman	£17.95
Tasword 464 (disk)	Tasman	£22.50
Tasprint (disk)	Tasman	£11.60
Tascopy (disk)	Tasman	£11.60
Mastercalc (disk)	Campbell	£27.00
Cashbook	Gemini	£54.00
Cashbook (disk)	Gemini	£58.00
VATFile	Gemini	£18.00
VATFile	Gemini	£23.00
Final Accounts	Gemini	£54.00
Final Accounts (disk)	Gemini	£58.00
Database Management	Gemini	£18.00
Database Management (disk) 23.00		
Report Generator	Gemini	£18.00
Report Generator (disk)	Gemini	£23.00
Home Accounts	Gemini	£18.00
Home Accounts (disk)	Gemini	£23.00

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Amstrad's PCW8512 – the success continues

Gary Evans reviews Amstrad's latest launch.

If you have been toying with the idea of buying an Amstrad PCW8256 word processor system, think again. The recent low-key launch of the PCW8512 means that on value-for-money grounds the 256K version of the PCW machine is a poor second best to the new model. The PCW8512 at £499 plus VAT costs £100 more than the 8256, yet to upgrade the 256K computer to the specification of the 8512 would cost in the region of £200.

There is little to say about the PCW8512 which could not equally well be said about the 256K version. The addition of a second, 720K formatted disc drive in place of the blanking plate on the 256 and the additional RAM which earns the computer its 512 badge are the only differences of note. There are a few cosmetic changes evident on the new machine but they are of a minor nature.

The PCW8512 shares the same strengths and weaknesses of the 8256 and the Locoscript software bundled with both machines. The extra disc drive and additional memory, though, remove some of the limitations which arise when working with only a single drive and the 112K RAM disc of the 8256.

Sin of omission

Having said to what extras the PCW8512 owner can look forward, perhaps it would be a good idea to mention the most obvious omission from the specification of the new computer – an RS232 port. The reason the new machine still has no built-in serial port is obvious, at least from the Amstrad point of view. The circuit board in the new machine is the same as that in the 8256, the only difference being that some of the empty holes on the board are now filled with memory chips.

The addition of the second disc drive also required no changes to the circuitry of the PCW8256. Adding an RS232 capability would have necessitated some circuit board redesign and that would have added significantly to the cost of the new machine, although the component cost to Amstrad would have been less than £1. The fact that Amstrad is selling a serial/parallel interface for around £70 may also have been a factor in excluding a serial port from the basic specification of the machine.

The decision not to add an RS232 is regrettable, as that would have compensated for the one obvious deficiency in the specification of the machine.

PCW Plus C/PM

Before going further I feel that I should declare a personal interest in the PCW range. I bought – yes, bought, as in paid for; it is not all freebies at *Your Computer* – a machine last year and for the last six months have used it extensively for the preparation of various articles, of which this is one. Having used a number of word processors, including Wordstar, Stylograph and View, for more years than I care to remember, I can say safely that I am a fan of Locoscript. What follows then is, I hope, an unbiased assessment of the two PCW computers, together with an indication of the advantages to be gained when using the 512K version of the machine with its extra facilities.

Locoscript update

The Personal Computer Word-processor machines are marketed primarily as stand-alone word processors and while the inclusion of the CP/M Plus operating system means that both machines can be used in a variety of applications, for many the computers will stand or fall on the basis of their performance as a word processing station; that is to say the key to PCW success is the Locoscript software bundled with each machine.

On call

Considering the complexity of the software, Locoscript V1.0, as supplied with early versions of the PCW8256, was a relatively bug-free product. There were some minor, well-reported problems, in particular the fact that it was not possible to enter page number codes as part of a document footer. The problems of V1.0 were corrected with V1.2 of the software, as supplied with the 8512 and more recent 8256s. In addition to correcting the V1.0 bugs, when Amstrad introduced V1.2 it took the opportunity to build in some extra features as a result of feedback from users – despite suggestions to the contrary Amstrad listens to the public, some of the time. Those extra functions include the ability to create ASCII text files from Locoscript documents and to print pages of document selectively.

One of the major selling points of Locoscript, according to Amstrad chairman Alan Sugar when the PCW8256 was launched, was that it was easy to use. Casual observation of the attempts by people trying to use the software on demonstration machines in high-street stores would tend to suggest that is not necessarily the case.

The manual which describes the operation of Locoscript has had a degree of criticism; it is certainly not for those new to the concepts of word processing. For those with plenty of time, the best way to get to grips with Locoscript is to set aside two days and simply experiment with all the available functions. If time is at a premium, the best solution is to sign for one of the many Getting to know Locoscript courses around the country. Your PCW dealer should have details of any available in your area.

Having once mastered Locoscript, despite what you may have heard to the contrary, it is an easy-to-use system. The dedicated function keys and on-screen prompts mean that it is easy to call required functions into action. Most word processing users fall into a group best known as the 80/20 set – the 80 percent of users who use only 20 percent of the available functions of their systems, because the way in which all but the basic commands are implemented, means that it is not worth the effort of using them.

If moving the cursor to the end of the current line means entering an obscure three-key sequence, it is probably easier to hold down the cursor right key until the desired point is

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reached. Locoscript, though, makes it easy to use the full range of commands available, which in turn leads to more efficient working methods. Locoscript compares favourably to many, more-established word-processors, though, like any other package, it is not perfect.

The heirarchical file structure of the main disc manager screen, a la Stylograph under OS9, is a distinct aid to the management of files on a disc, avoiding the jumble of files evident on a typical Wordstar disc. The display, while not WYSIWYG – What You See Is What You Get – gives a clear indication of how the printed document will appear, assuming that the optional display of modifiers is selected. That technique is borrowed from Wordstar, yet the authors of Locoscript have improved considerably on the concept.

Finding faults

Another useful feature of Locoscript is the ability to call in new text layouts at any point within a document. The standard template of any group will cater for the majority of work but it is useful to be able to enter a new layout when, for example, preparing tabular material in a standard text document. Keeping header and footer information out of sight in normal use, though easily accessible via the f7 key, leads to an on-screen display uncluttered by a jumble of lines containing this or/that commands.

The pull-down menus make the system easier to use for the inexperienced yet they can easily be by-passed by those more familiar with the software, thus saving a good deal of time.

Refinements such as the 'lines to go' indicator which is part of the on-screen page separator give the impression of a well-thought-out piece of software.

Driving dangerously

There are, however, some shortcomings to Locoscript. It can be slow, particularly when working with long documents. The save and continue option returns you not to the place at which you decided to save your current work but to the start of the document. It is possible to use the find facility in conjunction with a marker character to return to a specific place in a document but that involves extra keystrokes.

Other omissions from the Locoscript repertoire of instructions are those which would move the cursor a word at a time, both left and right, and an over-type mode of text entry. Locoscript can insert text only at the current cursor position; any unwanted material must then be deleted.

Another facility Locoscript lacks is a word count display, that being particularly useful for journalists with whom we are told PCW computers are very popular.

There are also no spell check or mail merge facilities. The latter is often an important consideration in business applications. If Amstrad does not supply them in the near future, though, surely a third-party vendor will fill the gap.

The benefits to be gained by the second drive and additional RAM are less apparent when using Locoscript than when using third-party applications software. Copying files from disc to disc will be easier with drive B available – there will be no need to use the RAM disc drive M as a temporary store. It is not often necessary to exchange files between discs. Neither is there a need to swap the system disc for a data disc at the start of a session with the PCW but again any such benefit is marginal at best.

For the brave, or foolhardy, with complete confidence in the continuity of the mains supply, it would be possible to work entirely with drive M during a session, saving to floppy disc only when work was complete. The elimination of the mechanical disc drive bottleneck would save some time but such a working method could not be recommended. when making minor alterations to a long document it would make sense to copy the file to the RAM disc while amending the file, copying the result back to either drive A or B. That technique, however, could equally be used with the 112K RAM disc of the PCW8256; no sensible Locoscript file will run out of room in that amount of memory.

If, then, your only use for a PCW computer will be the creation of Locoscript files and money is in short supply, the 8256 could still be the best bet. That, however, would be a short-sighted view. The computer is capable of far more than word processing and the extra features of the 8512 will be put to good use by many third-party software packages.

Drawing conclusions

A good example of such a piece of software is *DR Draw*, reviewed in the March issue of *Your Computer*. With only a single drive, DR Draw requires a considerable number of disc swaps in use. The second drive and expanded RAM disc make the package far easier to use.

Another example of a product which would benefit from the extra power of the PCW8512 is the Wordstar clone NewWord. If used correctly, the expanded RAM disc, together with a spelling checker, could check an entire document in a fraction of the time taken if mechanical drives were used to load the data into the computer.

The PCW8512 is sure to build on the reputation of the PCW8256, which has been selling well since its launch in the autumn of last year.

In my view, the new 8512 is certainly the best buy and should take the lions' share of PCW sales.

Third party PCW software

While the software supplied with the PCW computers – Locoscript, CP/M and DR Logo – allows the machines to be used as comprehensive word processors, the inclusion of CP/M means that third-party vendors can offer a wide range of additional applications packages which extend the power of the system considerably. The success of the machine has meant that there has been no shortage of companies jumping on the PCW bandwagon.

The following companies all have products available for the PCW8256 and PCW8512, most software is of high quality and, in keeping with the Amstrad philosophy, of low cost.

The list is by no means comprehensive but if you are looking for additional applications packages for PCW computers, one or more of the companies listed should be able to offer assistance.

Caxton Software, 10-14 Bedford Street, London WC2E 9EH
Spreadsheet, Record management.

Compact Software,
1 Ensbury Park Road,
Bournemouth, Dorset
BH9 2SQ
Various accounts packages

Digital Research, Unit 12, Fenton Way, Southfields, Basildon, Essex SS15 6SL
DR Draw, DR Graph, Pascal, Basic Compiler.

Newstar Software,
Brentwood, Essex.
Tel: 0277-220573
Wide range of products contact for details.

Sage,
HEI House, Regent Centre, Gosforth, Newcastle-upon-Tyne NE3 3DS
Tel: 091-284 7077
Communications, Accounts, Database.

Saxon Computing,
3 St. Catherine Drive, Leconfield, Beverley, Humberside HU17 7NT.
Tel: 0401-50697
Record management, Word-processor, label handler.

CPS8256 + MAIL232

Both the Amstrad PCW8256 and 8512 computers are marketed as offering users a complete stand-alone word processing system. That marketing man's view of the computers fails to recognise, however, that both machines are capable of far more than use in dedicated word processing applications.

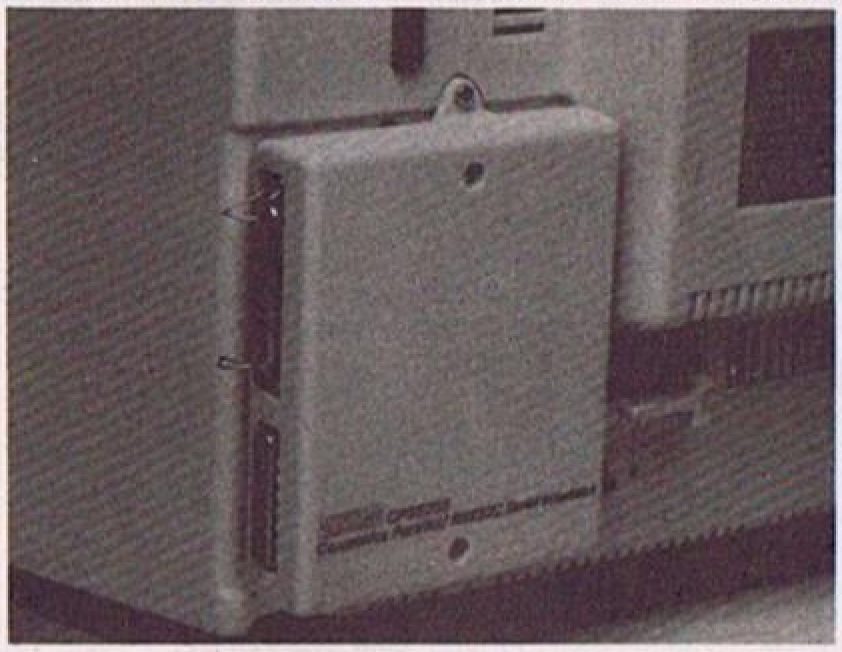
The key to opening a wider range of applications is the inclusion of the CP/M Plus operating system among the bundled system software. To realise the full potential of the machine, though, it is necessary to add one vital item of hardware in the form of the CPS8256 parallel and serial interface. That device allows data to be exchanged between the PCW computers and external peripherals, including printers, plotters and, crucially, a modem.

Expansion port

The CPS8256 plugs into the expansion port at the rear of the PCW computers, where it is held firmly in position by two fixing screws. Having fitted the unit, the user has access to two data ports via a 25-way 'D' type RS232 serial chassis plug and a 36-way IEEE-488 Centronics parallel connector. The interface unit is supplied with an informative 36-page manual, of which more later, but no software, for the simple reason that the necessary software is supplied as part of the package with the computer.

Those PCW owners who have had occasion to browse through the *Guide to CP/M Plus* featured in part one of the computer's User Guide will have found references to a number of CP/M utilities which concern themselves with the installation and configuration of the CPS interface; they include the DEVICE and SETSIO .COM files but many users will be surprised to find that there is another important item of system software concealed on side one of the PCW system discs, the disc which contains Locoscript.

It needs a little detective work to discover that software but if after loading Locoscript, the f8 – options – selection is made from the disc manager screen and, in turn, the show hidden files option is selected from the sub-menu which appears, a file called MAIL232 will show up in the first group on drive A. Notice that the file extension of MAIL232 is .COM, which indicates that it is not a Locoscript file but one which runs under CP/M. That file is included on the Locoscript disc because it is the only system disc on which Amstrad could find a spare 4K of disc space.



MAIL232 and the various CP/M utilities between them provide users with a basic suite of software which will allow them to use the CPS interface with a variety of serial and parallel-based peripherals.

MIAL232, in keeping with the philosophy of Locoscript, is menu-driven, with the available menus being selected by the computer function keys. The f1 menu allows the baud rates and framing bits to be configured, much as the SETSIO utility. The option 3 menu provides a means of controlling file transfers. The user may pre-load both receive and transmit file names and then exit to the main menu. When on-line, the f3 menu may be selected and the enter key used to initiate the transmission or reception of a file. In addition, that menu allows the user to select to exchange either an ASCII or Hex file.

The f5 menu selects between the on-line and local modes of operation, while the f7 menu allows the user either to enter a Z19/VT52 emulation mode or to exit to CP/M.

MAIL232 was used with a Prism 2000 modem to log on to Telecom Gold via a 1,200/75 port. having selected the appropriate options from the f1 menu and dialled into 'Gold, the familiar sign-on message appeared and we were able to down-load one of the service's information files using the options available under the f3 menu. When saving e-mail files, a Locoscript data disc should be in the computer drive. When off-line, it is then possible to load the Locoscript software, at which stage the down-loaded text file will appear in the first group of documents..

E-mail

If you select that file and try to edit it, though, Locoscript will display an error message. To overcome that, first create a new document, then select the f7, insert text option. Load the e-mail file and you will then be able to edit it as if the file were created initially under Locoscript. Conversely, e-mail files may be prepared off-line under Locoscript and then the f7 option, create an ASCII file, option selected from the disc manager screen. That file may then be transmitted from within MAIL232.

The CPS8256 interface will be essential purchase for many PCW users. The device allows the computer to interface withe a range of peripheral devices. They may include parallel and serial printers and plotters and a modem. The software supplied with the computer meets the basic requirements of such applications, although those which make extensive use of e-mail services or those who need to use prestel-type services would be recommended to buy additional software.

Prestel possible

If operation with Prestel is required, the user will have no choice but to buy a Prestel emulation package – in the case of ASCII-based e-mail services the no-frills MAIL232 software does not offer sufficient facilities to make extensive use of e-mail a practical proposition; in particular, the need to swap discs and operating systems continually to prepare an edit file off-line would prove tiresome.

The manual supplied with the interface may be difficult for those new to comms to follow; many users may need some additional hand-holding to get the most from the interface. For those interested in the technicalities of the RS232 serial data exchange standard and the operation of modems, though, the manual offers one of the best explanations of the basic principles one could hope to find.

At £59 plus VAT, the interface is an expensive but essential add-on for the PCW8256 and 8512 computers. As more and more PCW users realise that fact, the CPS interface will prove to be yet another good little earner for the company.

Load 'n Go software

The ever-productive Peter Luke assesses a range of home productivity software to be marketed by Argus Press Software.

Home productivity software is not new, although the term will be new to many in the U.K. The difference between home productivity software and business software does not lay in the function of the products grouped under the headings but rather on where it is that they are to be used. Thus a word processor used at the office is an item of business application software; take the same product home and it transforms itself into a home productivity package. Home productivity is very big in the States at the moment and many software houses in the U.K. are looking to this application area to provide them with much-needed growth during the next year.

Experience in the States has suggested that the key to successful marketing of home productivity software is to offer the user a package which offers an acceptable level of performance at a very low price. One of the most successful of U.S. firms with a stake in the home productivity market is Sharedata Inc with its range of Load 'N Go products for the Commodore 64. In the U.S. they retail at $5 plus sales tax; at those give-away prices the software is selling at levels measured in hundreds of thousands.

Sharedata recently signed a deal with the Argus Press Software Bug-Byte division, which is to market a selection of Load 'N Go software in the U.K. Initially nine packages will be available, with more to be added if the trade and public take to the idea of home productivity.

Load 'n go collection

All the Load 'n Go software is supplied on disc and that is potentially the biggest disadvantage so far as many Commodore owners in the U.K. are concerned. The percentage of C64 owners who already have a disc drive is far lower in this country than in the U.S. In addition, to make the most effective use of any of the packages, a printer would be required. Assuming, however, that the potential Load 'N Go user has both a disc drive and a printer, at £7.99 the software offers undoubted value.

In an article of this length it is impossible to do justice to the features of all the products in the range; three have been selected for closer attention.

All of Load 'N Go software is supplied in a bubble pack containing a single 5¼in. disc. No paper documentation is provided; all the necessary instructions are supplied as help files on the system disc. The reason plainly is to keep unit production costs to a minimum, although that approach has advantages, not least of which is that as space for disc-based text files is at a premium, the authors of the software had to ensure that it is easy to use and thus most users will need little in the way of additional help.

The major irritations when using Load 'N packages can be attributed not to the software but to the hardware of the Commodore 64. The 40-column screen display is a handicap when using some of the programs but the main irritation is the slothful performance of the Commodore disc drives – waiting five minutes for a disc to be formatted before using an application may provide an excuse to make a cup of coffee but is not much help if you want to retrieve an item of data urgently.

Having described the general concept of the Load 'N Go software range, some of the individual products are described in more detail.

Card file

The Home and Card Business file is a straightforward card file system which allows a set of names, addresses and telephone numbers to be entered. They may then be searched so that a specific record or group of records may be selected by creating an appropriate template.

As with other software in the Load 'N Go range, the Card File program was written for the North American market and no attempt has been made to translate the software for the needs of European users. In most cases the fact that the software has not been adapted occasions some minor quirks but no major problems. In the case of Card File, however, the fact that the format of addresses in the U.K. differs considerably from those in the States and that the program builds-in a line-by-line error checker which will allow only addresses in the U.S. format to be entered combine to cause a few headaches.

The difficulty is most accute when trying to add a post code to the end of an address file. The blank addres form features spaces for a State code (two letters) and a Zip code (five figures). It is not possible to enter a post code within this area yet the software demands that those areas have data entered to them.

Another irritation is that the Card File does not allow spaces, or any non-alpha characters, within the telephone number field. As it is common to show U.K. number in the form 01-222 9090, seeing only 012229090 can be a little confusing at first.

Those problems aside, the software is a reasonable example of a computer filing system. Having entered the records, the data may be scanned, record by record, or may be searched for a specific record either by the first or last name of the entry, or by business name or type. The records may be displayed either on-screen or dumped to a suitable printer.

When assessing the quality of any product of this kind, the price of the package is an important factor when considering overall value. Thus while Card File has its limitations, at only £7.99 the program must be judged to offer reasonable value.

Electronic scheduler

Electronic Scheduler is designed to provide a computer-based diary to keep track of appointments. Each entry consists of the name of the person making the appointment, the person with whom the appointment is made, the dat and time, he place at which the meeting is to take place, and field titled for, in which details of the appointment can be entered. In addition a 3x31 comment line can be entered at the end of each record.

Once again, the American authorship of the software is apparent in a number of areas, not least of which is the format in which the date must be entered. That means that rather than enter 01/05/86 for May 1, the date must be entered as 05/01/86.

Having entered a series of appointments into the Scheduler, the software provides a comprehensive range of find options by which specific diary dates may be displayed on-screen or printed-out as hard copy. They include options to retieve information by name, place or date. In the case of the date option, it is possible to select a time window between specified dates and display entries between them.

Once again, considering the £7.99 price of the Electronic Scheduler, if you want to use an electronic diary, few people will find the package does not offer value.

To retail Load 'N Go software at such

low prices, it is obvious that some sacrifices have to be made. Sharedata freely admits that one of the ways in which it keeps down costs is by making no provision for customer support in its costings. it maintains, with some justification, that as the software is easy to use and provide with plenty of on-disc help files, users should not need their hands held when the use the packages. It argues further that, as the software is so inexpensive, users should be prepared to pay for improved versions of any package if they want to take advantage of any enhancements. In fact, most of the software in the Load 'N Go range is subject to a continual series of revisions, based on feedback from users. In no case is that more apparent than in the Master Word word processor which has reached release version 2.6.

Master Word

Master Word is an icon-driven package which offers a comprehensive suite of word processing functions which would put some £100-plus software to shame. Once again, though, it is the hardware of the Commodore 64 host computer which both slows the actions of the software – be prepared for plenty of Loading . . . Please wait messages – and limits the amount of data which can be displayed on the screen at any time.

Having loaded the software, the user is presented with the main menu screen with a series of options which are selected by positioning an on-screen box over the appropriate icon by means of the cursor key and then hitting the return key. Each of the main menu options will take the user to a series of sub-menus, through which the entire operation of the system is controlled.

It is difficult to fault the package in terms of the facilities offered; almost every WP function you could name is provided by Master Word. An exceptional function on packages of this type and one which goes some way to compensate for the shortcomings of the C64 display while editing text is a low-resolution image of the complete page as it will appear when printed-out.

Thus while the main editing text window can display only part of the page and is about as far from VYSIWYG (What You See Is What You Get) as it is possible to imagine, the page image gives a passable representation of the final page.

If you want a word processor for the Commodre 64, you will find it difficult to beat the range of functions offered by Master Word; at £7.99 it must be a winner.

Load 'N Go software is taking the States by storm at present that its chances for similar sucess in the U.K. are rather questionalbe, since the percentage of C64 owners with access to both a disc drive and a printer is still very low. The argument put forward by some is that if the software is good enough, the public will buy the hardware simply to be able to use the software.

A good buy

A disc drive, though, costs more than £100 and a printer will add at least £150 to that figure. Thus for the non-disc, non-printer owner the entry-level price for Load 'N Go will be at least £250. That is a relatively high cost and the user would have to be very commited to the idea of home productivity to spend that kind of money. So until the price of disc drives and printers falls and lead to an increased ownership of those peripherals, Load 'N Go, while offering excellent value, will have limited appeal.

TASWORD THREE

► *Spectrum ● Tasman Software ● Word processor ● £16.50*

One of the reasons that professional disc-based packages like Worstar can offer so many features is that they use a system of program overlays, so that all of the programs need not be resident in memory at the same time; if that was so there would be no room for the text file. It was impossible to implement on Tasword Two, since it was written before Microdrives were available and had to be loaded from cassette. Tasword Three will not work from cassette, and the program cartridge has to be resident in drive one at all times to enable the overlays to be loaded as needed.

Tasword Three retains all the features of Tasword Two and has a number of additional ones. It is also faster. It can print 128 columns of text, with the screen window scrolling smoothly sideways to accommodate the extra width. Two comprehensive help pages are available, with the top third of the screen being set up for a resident help menu. That feature can be turned on or off. After an hour or so of practice, the help menu can be removed to show a full screen of text.

The delete menu is comprehensive, allowing the user to delete to the left of the cursor in the normal way, or to delete the character under the cursor. Whole words, lines, paragraphs, blocks or even the entire text file may be deleted. A pleasant feature is the way the program remembers the last line you have just deleted, enabling it to be recalled in case it was done in error.

Inserting text is simple, with a choice of three insert modes – character insert, line insert and full automatic insert – with re-justify if automatic right justification is "on". When using search and replace, Tasword is told the text to be found and with what it is to be replaced. Replacement may be defined as selective, in which case the program stops at each "find", enabling the user to decide whether to replace or not. Tasword will re-form each paragraph automatically during all replacements.

Tasword Three supports Tasprint, a utility permitting a variety of interesting fonts to be printed using a dot matrix printer. The most impressive new feature is that Data Merge files may be set up using Tasword Three, or the Masterfile database program by Campbell. A standard letter or document may be printed any number of times, each copy addressed individually from a list of names and addresses held in Masterfile.

In addition to the program files, the Tasword Three cartridge is complete with seven tutor/text files for practice and education, a program for converting Tasword Two text files to Tasword Three format and a program called "MF" to utilise Masterfile. The 64-page manual accompanying the program is very extensive and clearly-written, with many examples to demonstrate the new Data Merge features.

Fortunately there are only two grumbles. Tasword Three is all machine code and so those with discs must rely on Microdrive. The other moan is that a 128K Spectrum owner will be annoyed that the program overlays could not be stored inside the machine and paged in and out, instead of relying on the program cartridge.

Tasword Three is a very impressive package and obviously well worth £16.50 price, even if you already have Tasword Two.

SOFTWARE SHORTLIST

SAM FOX'S STRIP POKER

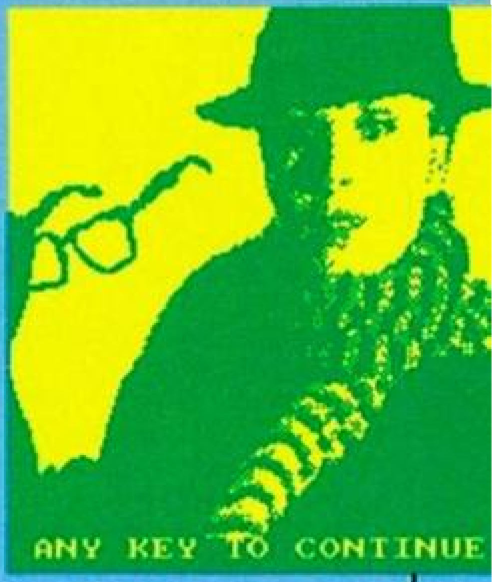
► *Spectrum & Amstrad ● Martech ● Card Game ● Lee Paddon ● £8.95*

Right, no jokes about "raising her pair" or "she was trying hard to disguise her flush". All that kind of sexist stuff is out. Dear old Sammy, bless her, everyone's favourite topless model. Star of page three, chatshows, records and now computer games.

The game is seven-card stud. As Sam loses money, so the clothes disappear – £200 equals one layer. It is no easy task, as she plays a reasonably good game and is by no means reckless with her money. Most hands tend to finish with one or other player folding while the stakes are still low. While playing the hand, the pot, your remaining money, and the hands are displayed. At the end of the hand, a sequence of frames shows Miss Fox's present state of deshabile. The detail is such that even admirers might feel they were missing something. When you have had sufficient of that you can turn to side two and play a four-handed game.

GRAPHICS
● ● ●
SOUND
● ● ●
PLAYABILITY
● ● ●
VALUE FOR MONEY
● ● ●
OVERALL
● ● ●

An unoriginal idea put together in a fairly ordinary way, but probably Sammy's assets will turn it into a number one.



ATTACK OF THE KILLER TOMATOES

► *Spectrum ● Global Software ● Arcade Adventure ● Lee Paddon ● £7.95*



Nothing will have a games reviewer heading for the Valium faster than a 3D isometric adventure with a film tie-in. Never fear, Global Software has found a new method for this tired old approach. Film tie-ins are usually the province of large software companies with plenty of cash to buy the rights.

Global has hit on the idea of Golden Turkey film tie-ins with some of the worst pieces of celluloid ever to grace the silver screen. The logic is presumably that they will not have to pay rights, as no movie company will admit to having them.

In the game, your hero, Wimp Plasbot, clocks on at 9 o'clock to find the tomatoes at the local cannery have mutated. Wandering through the 208 rooms spread over four levels, our hero must use various objects he finds scattered around to trap the killer tomatoes.

As usual, there are all kinds of deadly things out to get you and various problems to solve. Meanwhile, you must keep up your puree level by crushing the unmutated toms.

GRAPHICS
● ● ● ●
SOUND
● ● ●
PLAYABILITY
● ● ● ●
VALUE FOR MONEY
● ● ●
OVERALL
● ● ●

THE CORE

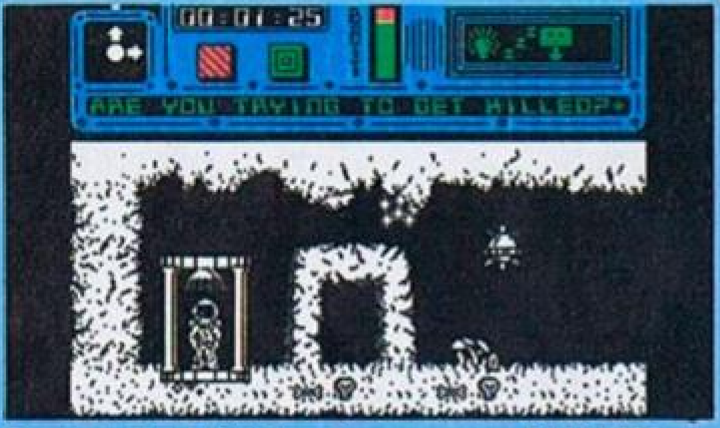
► *Various ● A'n'F Software ● Arcade Adventure ● £8.95*

Why is it that there is always some alien trying to take over the world? Well, in this latest epic from the people who produced *Chuky Egg* the aliens have wiped out one of your asteroid colonies. You have the unenviable task of going in and finding out how and why – perhaps he had just had a difficult day at the office and wanted to let off steam.

The action takes place on a 2D scrolling screen rather like the Microgen *Wally* games. Above the playing area is a read-out with various icons telling you which exits are available, the current state of your backpack charge which you are carrying, and so on.

As is traditional in this kind of game, you have to find various objects and decide what to do with them. With 1,000 locations spread over four levels, solving this one should keep addicts happy for hours. In the grand tradition, there is no map; making one will be your first priority, so when you find the watch-'em-a-callit which might just fit in the widget, you will know where to find it.

Some of the most important objects are buried and so a spade is fairly high on the priority list. The whole thing is joystick-controlled, with pick-up, drop and use being accessed using the icons.



Once you have the idea of that, it is reasonably quick to control and could save lives when you are groping frantically for the right key in a tight spot.

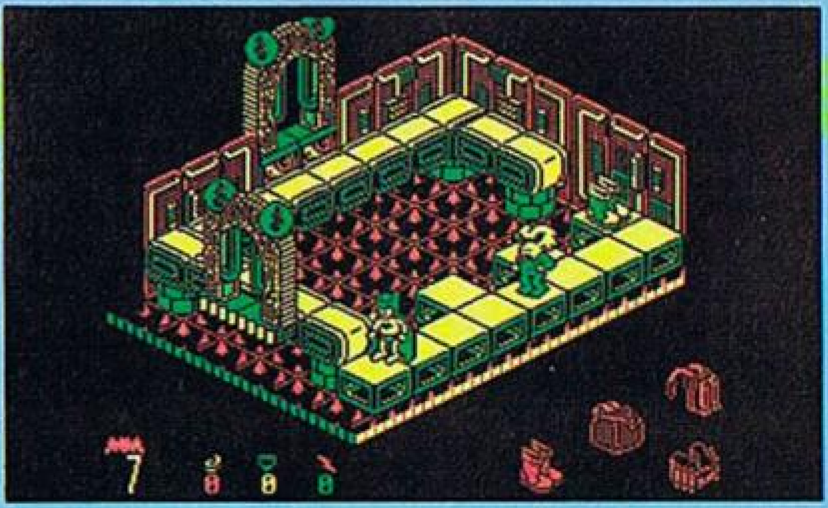
A welcome return to form by A'n'F, which will give arcade adventure fans many happy, puzzling, hours.

GRAPHICS
● ● ● ●
SOUND
● ● ●
PLAYABILITY
● ● ●
VALUE FOR MONEY
● ● ● ●
OVERALL
● ● ● ●

BATMAN

▶ Amstrad & Spectrum ● Ocean ● Arcade Adventure ● £7.95/£8.95

GRAPHICS
●●●●
SOUND
●●●
PLAYABILITY
●●●●
VALUE FOR MONEY
●●●●
OVERALL
●●●●



Suffering catfish, *Batman,* we're a computer game. Robin, the boy blunder has been kidnapped. Instead of, like any normal evil guardian saying good riddance and keep thé maintenance money rolling in, Batman goes to the rescue – to the Bat Cave.

Unfortunately, the interior designers have been there and the Bat Cave is not what it used to be. You've guessed it, another *Knight Lore* clone. All the usual problems confront the caped crusader as he attempts to piece together the Batmobile which Robin left in pieces after the last service.

You have 10 lives with which to explore the 150 locations and you will need them. To start, all you can do is walk in four directions. Later, you pick up the Bat Bag, and then the Bat Boots which allow you to carry and jump. Definitely in the *Sweevo's World* school of tongue-in-cheek graphic adventures, this perhaps will not have you holding your sides the way Sweevo did but it probably has more depth. Some rooms are possible only if you go to them after just picking up a shield Batpill; thus planning and timing become all important.

It is difficult to say where this will finally find a place in the ratings of such games. The variety of objects and hazards, combined with the size and degree of dexterity and problem-solving, will guarantee it a place among the best.

SILENT SERVICE

▶ CBM64 ● Microprose ● Simulation ● Lee Paddon ● £14.95

On the U.S. Gold label, *Silent Service* puts you in the driver's seat of an American submarine in the south-west Pacific in WW2. Sinking Japanese merchantmen, it seems, was not so easy as in the movies. Switching from attack plot to periscope, you watch the prey waiting for your moment to strike. Then, as you are closing in for the kill, the escort has spotted you. Dive like mad and hope you can shake them off and then it is back to the cat-and-mouse game again.

It is not a game for zap freaks but one to which the more thoughtful player will return to time and again. Four levels of difficulty and a number of "realism factors" – dud torpedos, expert escorts – mean this is the kind of simulation of which you are unlikely to tire.

Most of the controls are from the joystick, with icon selection leading you into one of the "sub" screens for plotting movement, firing torpedos, checking damage or supplies. Despite that complexity, the game plays easily.



GRAPHICS
●●●●
SOUND
●●●
PLAYABILITY
●●●
VALUE FOR MONEY
●●●●●
OVERALL
●●●●

Commonsense will usually let you know what to do where. Unless you have ever done this for real, realism is difficult to estimate, but such factors as spotting distance, variable speeds, limited stores and repair rates give a very authentic feel. It is one simulation addicts will want to add to their collections.

DOOMDARK'S REVENGE

▶ CBM64 ● Beyond ● Adventure ● Lee Paddon ● £9.99

GRAPHICS
●●●●●
PLAYABILITY
●●●●
VALUE FOR MONEY
●●●●●
OVERALL
●●●●●

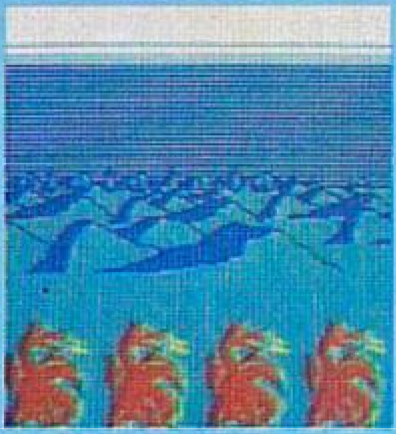
Beyond has been rather quiet since it was bought by BT but now it is back with a bang. One of the company's best games for the Spectrum has made it to the Commodore, with Amstrad and Atari versions to follow.

Doomdark's Revenge is the second part of Mike Singleton's epic trilogy depicting the legends of the land of Midnight. In the first part, *Lords of Midnight,* you had to defeat the Dark Lord either on the battlefield or by destroying his ring of power. In this second part, his daughter has kidnapped your son. You must ride into uncharted lands to rescue him.

The sheer scale of the game is staggering. There are 6,144 locations, 128 characters and a similar number of objects. The game uses the exeptional landscaping feature. When you look out from your location, the view quickly is drawn, showing in perspective all the features you can see. Rescuing Morkin is best left to his girl-friend and Luxor's job is to collect an army from among the various races to keep shareth busy.

The other characters all move round the place independently, intent on their own little quests, and you must exploit their characters and find objects which will help you.

The game represents the best of both worlds – the easy playability of an arcade game, with menus and graphics, and the problem-solving strategy of an adventure. The game is in a double cassette pack and



includes an audio tape with the background story to the adventure. -

TOMAHAWK

► *Amstrad ● Digital Integration ● Simulator ● Lee Paddon ● £9.95*



GRAPHICS ● ● ● ● ●
SOUND ● ● ●
PLAYABILITY ● ● ●
VALUE FOR MONEY ● ● ● ●
OVERALL ● ● ● ● ●

If you always thought flight simulators were too much like hard work, *Tomahawk* will be something of a revelation. After all, you should not have to fly the world's most advanced attack helicopter by the seat of your pants.

The out-of-the-cockpit view gives a detailed view of the world outside. Wire frame graphics include enemy helicopters, tanks, field guns, buildings, mountains and woods. It is not just *Fighter Pilot* with a different set of performance figures – this game gives you the feel of skimming over the trees at 180 knots.

All the controls are a combination of joystick and keyboard. The joystick controls the pitch and roll of the machine. That, coupled with the collective control, determines speed and lift. That takes getting used to but, due to the built-in stabilisation, after a little practice, you will be able to throw the machine around like a pro.

There are four missions, the longest of which requires four or five hours of concerted blasting. The weapon array is very formidable, with missiles, rockets and machine guns. For the masochistic, flying round at ace level with a 50ft. cloud base is a fascinating, if usually short-lived sensation.

GREEN BERET

► *Spectrum/Commodore ● Imagine ● Shoot-'em-up ● Peter Luke ● Spectrum £7.95/Commodore £8.95*

GRAPHICS ● ● ● ●
SOUND ● ●
PLAYABILITY ● ● ● ●
VALUE FOR MONEY ● ● ● ●
OVERALL ● ● ● ●

The controls of *Green Beret* are similar to the jump up, down, backwards and lie down movements which characterise the recent crop of martial arts games, although some of the more sophisticated movements available in the best of them are missing from beret. To compensate for the fact that you cannot somersault, though, you are equipped with an inexhaustable quantity of knives with which to wipe out The Enemy.

There are four defence stages to battle through, with an all-out offensive launched at you at the end of each stage. A series of platforms and ladders allow you to climb out of the way of the enemy troops, while to avoid the knives being thrown at you the only solution is to hit the deck.

At each stage it is possible to pick up extra weapons in the shape of flame-throwers, grenades and rocket launchers – you will need them to get safely to the next stage.

At the start of the game you have three lives, with bonus lives being given at 30,000 points and every 70,000 points after that.



Good graphics and plenty of on-screen action make it a very playable game. All but the most skilful of players will also find that Green Beret will take some time to master. The game is easy to get to grips with yet offers plenty of interesting action to ensure that it has more than a fleeting attraction.

FA CUP FOOTBALL

► *Various ● Virgin Games ● Football manager simulation ● Simon Beesley ● £7.95*



GRAPHICS ● ●
SOUND ● ●
PLAYABILITY ● ● ●
VALUE FOR MONEY ● ● ●
OVERALL ● ● ●

Which game still sold sufficient copies to earn a place in the 1985 overall top 20 three years after it was released? The slightly surprising answer is the Addictive Games *Football Manager*. Surprising because it is written in Basic, the graphics are crude, and the action proceeds at a snail's pace. It offers you the convincing illusion, however, that your shrewdness as a manager determines the outcome.

That is just what *FA Cup Football* is lacking. The idea is to take one of 10 teams through eight rounds of the F.A. Cup competition to the final at Wembley. Along the way there is very little scope for showing your managerial skills. You have no say in the team selection and matches are not decided on the quality of the players. Instead, the game bases the results partly on the "real performance figures" of the teams concerned in the last 10 years. In other words, if you select a Fourth Division or non-league club you probably will not survive more than a few rounds.

It may be realistic but it does not make for rivetting game-play. Taking a team to the top of Football Manager's First Division can keep you up all night. In FA Cup Football, if you are in a hurry the whole business can be wrapped up in less than 20 minutes. After selecting 10 teams you have only one major decision to make before and during each match – whether to adopt defensive, balanced or attacking tactics.

SUPERBOWL

► *CBM64 & Spectrum ● Ocean ● Sports Simulation ● Lee Paddon ● £9.95*



Americans are not subtle people. Therefore it follows that when they invent a sport, they make it as complicated as possible. Not only does football kill more players in an average year than boxing – it has an entire language and logic all of its own.

Superbowl is the Ocean attempt to capture the atmosphere of the sport which became war. The last attempt was by Argus. You choose the play and the computer decides how many yards were gained or lost.

Ocean has taken the idea a stage further. You have more flexibility with the choice of offence and defence, with the defence even being able to decide which players to mark. Once the ball is snapped – in play – you control the ball carrier. That, along with some pleasant facets like a video scoreboard showing a replay and displays showing the action of the man under joystick control during play, gives a good feel of the action.

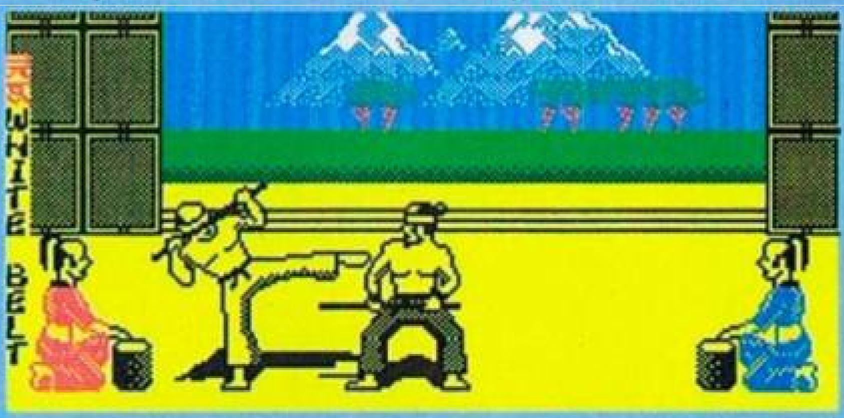
For the rookie, there is even an audio tape telling you all about the game and its arcane vocabulary. Training is vital, especially with pass plays. You do not become Dan Marino overnight.

The game might fill that void on Sunday evenings until the next NFL season begins.

GRAPHICS
●●●●
SOUND
●●●
PLAYABILITY
●●●
VALUE FOR MONEY
●●●
OVERALL
●●●

SAI COMBAT

► *Spectrum ● Mirrorsoft ● Beat-'em-up ● Lee Paddon ● £6.95*



Another combat game? Sai it isn't so. What new wrinkle on this hoary old subject can Mirrorsoft produce? *Sai Combat*, so it is said, originated in Okinawa. It is all about using the Sai weapon – a long stick – to deliver and block blows. It is also used as a form of Japanese aerobics, performed solo – all those curious Japanese beating-up trees in local parks on documentaries. Despite that, there is no practice mode in the game, so turn to two-player mode and practise beating-up a motionless opponent.

As usual, there are 16 moves you can make, a combination of walks, somersaults, blocks and strokes. The essential thing is to determine the correct range for each of the attacks and what to do if your opponent makes a particular attack. In one-player mode, you work your way up the ratings, three falls deciding each confrontation, a total of 16 opponents with which to play.

All that takes place against the usual oriental backdrop, with some very pleasant animation of the fighting figures, which are far larger than *Exploding Fist*. There are the usual problems associated with joystick control; getting precise movement in eight directions is tricky. That is not helped by the position of the keyboard controls, which would probably defeat the dexterity of a sleight-of-hand artist.

Sai what you like about the game, it is good, no-nonsense martial arts stuff with some really good animation.

GRAPHICS
●●●●●
SOUND
●●●
PLAYABILITY
●●●●
VALUE FOR MONEY
●●●●
OVERALL
●●●●

DEATHSVILLE

► *Amstrad ● Bubblebus ● Arcade Adventure ● Lee Paddon ● £8.95/£12.95*

Man, like this place is really *Deathsville*, I got to get out. But how? I mean, like there's no door. Sammy Solver is deep in Deathsville. Modelled closely on Eastbourne on a Friday afternoon, it is not a place you want to be. The dead are beckoning you constantly to join them, fall asleep and the local undertakers will have you in a box faster than you can say vascocardiogram.

Fans of the Wally series will be on familiar ground with what amounts to a fairly close copy of the Microgen hit – A 2D series of screens with plenty of objects scattered around. You have to determine which objects to drop, where to continue your quest and find the way out. Your time remaining is displayed continuously at the top of the screen as a hand trying to draw you towards a grave.

With 27 objects, four of which can be carried at the same time, and some 50 screens, there is plenty to keep the graphic adventure freak happy. Some of the graphics are a trifle crude and, at this kind of price, you would expect better sound effects, but the mix of fiendish problems, humour and dexterity mean this game should do well.

GRAPHICS
●●●
SOUND
●●●
PLAYABILITY
●●●
VALUE FOR MONEY
●●●
OVERALL
●●●



TURBO ESPRIT

► Spectrum ● Durell Software ● Car Driving ● Lee Paddon ● £8.95

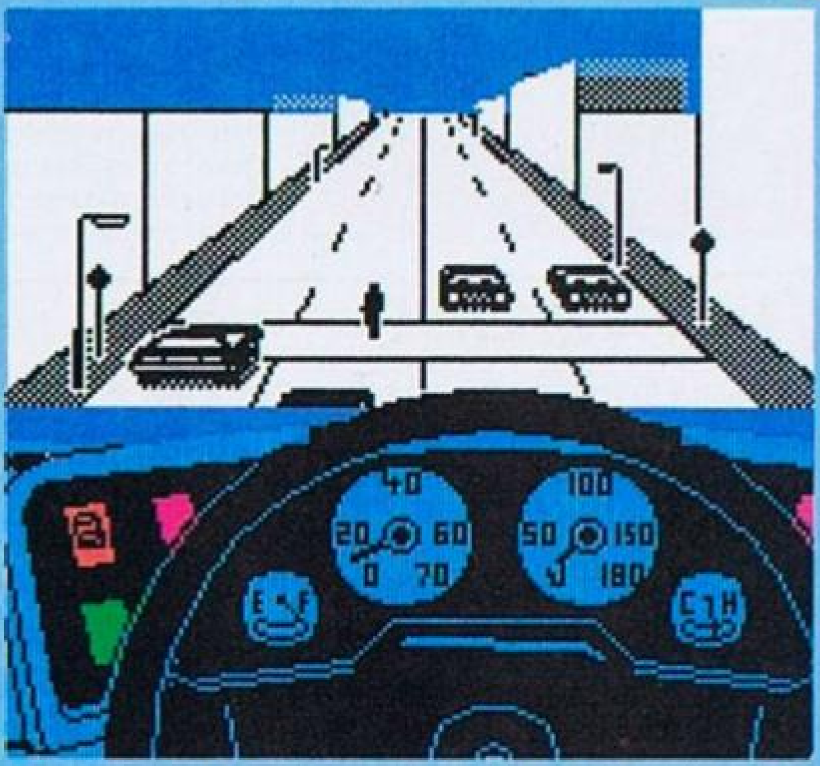
Mix a little *Death Race 2000* with a large pinch of *French Connection* and add a little *Cannonball Run* to taste. They are the ingredients of the Durell game which is destined to rise to the top of the charts.

If, like me, your annual salary would not even make a down payment on one of those sleek machines, this is about the nearest you are likely to get to driving a Lotus Esprit. Better than that, it has reinforced bumpers and, naturally, a machine gun. On the mean streets, in one of the four towns provided, your job is to break up the local drug racket. It is no simple shoot-'em-up but a beautiful blend of driving simulator and strategy game with an arcade element included.

Car games have always been notorious – they opted either for simplicity or reality at the cost of all playability. Author Mike Richardson has found a compromise. All the controls are on the joystick. Accelerate, brake, fire, turn left and right. All the street intersections are right angles; if you move the joystick left and right, you change lane on the multi-lane highways; if you do that with the fire button down, you initiate a 90-degree turn. If you do it at a junction, the view snaps round instantly to show you the new street along which you are driving. The graphics obviously owe much to Richardson's previous game, *Combat Lynx*. All the buildings on the street move past you in true perspective. Other graphic detail includes traffic lights, pedestrian crossings – with pedestrians – window cleaners and, of course, other cars.

Once you have become accustomed to the car and finished admiring the scenery in the practice mode, it is time to tackle the game proper. Select from one of the four skill levels and away you go. A message indicates where the drug van is. You call up the map and determine a route. It is best to stay on the main roads if possible, as overtaking is easier. Once you are near the drug van, you wait for the pushers to make their pick-up. Once that happens, the race is on. In true Gene Hackman style, you tear after the pick-up car. Eventually, with a little luck, you will catch him before he reaches his hideout – but mistakes are easy. It is all too simple to be delayed in the traffic while the baddies get away.

Getting the most from your car is an art. The faster you take a corner, the wider the car turns, and precise timing of a turn is essential. It is often



difficult to resist taking your like in your hands and trying to overtake in another lane and seconds later a car bears down on you from nowhere. It is fortunate you have four lives.

Perhaps the only gripe is the way when you switch to map mode you cannot see the road; a split-screen approach would have been far better. That is particularly frustrating when in pursuit. You lose sight of the enemy, who turns off as you go hurtling past; realistic but annoying.

Amongst the slough of martial arts and arcade adventures, this kind of game is like a breath of fresh air. Original, well-thought-out and absorbing, it is great fun. You can even play the maverick, machine-gunning innocents and running-down pedestrians piling up the penalties.

GRAPHICS ● ● ● ● ●
SOUND ● ● ●
PLAYABILITY ● ● ● ●
VALUE FOR MONEY ● ● ● ●
OVERALL ● ● ●

KARATE COMBAT

► BBC ● Superior Software ● Beat-em-up ● £11.95/£8.95



It seems only yesterday that *Way of the Exploding Fist* burst on the scene. Since then, martial arts games have gone through almost every conceivable permutation. Now, Superior Software brings its considerable expertise in BBC games to the subject. Fist fans will find themselves on familiar ground – 16 manoevres, with eight directions and use of the fire button. There is a practice mode against an oriental punchbag.

In the one-player option, you engage a series of 16 opponents of increasing skill. Your simple task is to exhaust your opponent's stamina before he does the same to you. Joystick control is essential as the keyboard is very awkward to use. A neat touch is that you can be penalised by loss of endurance by constantly going for the same move. That is a slightly artificial way of avoiding the Fist problem of continuous leg sweeps.

The graphics are effective, with pleasant background music and suitable sound effects indicating who has hit whom. The animation is a little below par for this kind of game. The tactics of the fight is involved and there seems a great deal of scope for perfecting your technique.

Bearing in mind that the BBC version of Fist was probably the weakest, this is not a bad imitation with a few interesting ideas of its own. All things considered, there is little to choose between this and the original.

GRAPHICS ● ● ●
SOUND ● ● ●
PLAYABILITY ● ● ●
VALUE FOR MONEY ● ● ●
OVERALL ● ● ●

THRUST

► CBM64 ● Firebird ● Shoot-'em'up ● Lee Paddon ● £1.99

OVERALL ● ● ● ●



Old themes never die, they just appear on budget games. The latest release in the Firebird Silver Range is none other than the old arcade classic *Gravitar*. You have to pilot your craft past a planet's defences and pick up a ball. Unfortunately, that is connected umbilically to your ship and has weight and momentum. That causes all kinds of problems as you attempt to leave the planet, pausing only to blow up the local nuclear reactor. At later levels, invisible surfaces and reverse gravity add to your problems.

MR PUNNIVERSE

► C16 ● Mastertronic ● Platform ● Lee Paddon ● £1.99

OVERALL ● ●

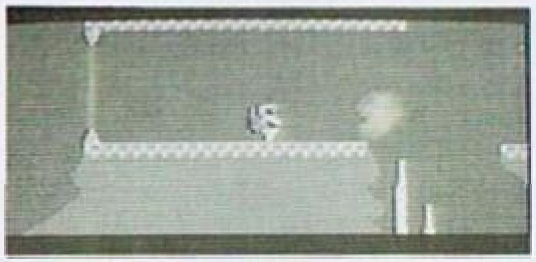


Mastertronic has cornered a fair slice of the C16 software market. On the evidence of this game, that might seem surprising. It is a platform game where you have to go round collecting vitamin pills. Various things fire at you and try to stamp on you. Walkways collapse as you walk on them and you have three controls – left, right and jump. Twenty-five screens of this sheer tedium are presented for your delectation. It is all against the clock, with tacky graphics and nasty sound. It will probably sell a million.

PHANTOM OF THE ASTEROID

► CBM64 ● Mastertronic ● Shoot-'em-up ● Lee Paddon ● £1.99

OVERALL ● ● ●



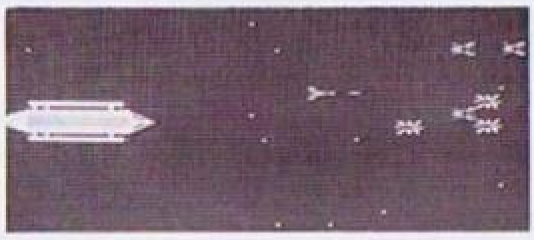
Asteroids are tricky things, especially this one which is plunging towards Earth. Instead of blowing it away with a spare ICBM, you have the far more difficult task of going in, gathering some handy chunks of uranium, and then leaving before the whole thing goes sky-high.

Naturally, there are swarms of indigenous beasties whose happy home you are breaking up. It is basically a version of *Jet Power Jack*, with a pleasant scrolling map, plenty of things to pick up and fire at. While not particularly original or brain-straining, it should keep you happy for a time.

SPACE ESCORT

► C16 ● Atlantis ● Shoot-'em-up ● Lee Paddon ● £2.99

OVERALL ● ● ●



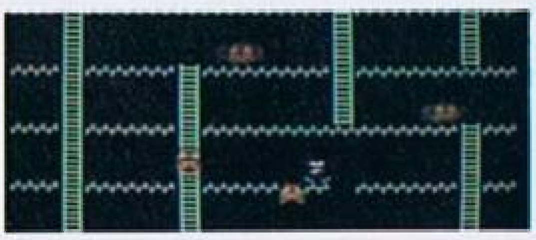
It seems the appetite for shoot-'em-ups is insatsiable. As usual, shoot everything in sight and dodge the bullets, and UFOs. Your mission is to escort a freighter. The large, cumbersome object sits on one side of the screen while the aliens attack it. Only you can save the freighter. After four waves, the freighter reaches the planet and you get a bonus. Control of the space ship is by joystick or keyboard.

Fast, noisy and reasonbly addictive, the game has everything the zap addict will want.

PANIK

► C16 ● Atlantis ● Platform ● Lee Paddon ● £2.99

OVERALL ● ● ● ●



Last seen three years ago on the BBC and called *Digger*, this is an interesting combination of reflexes and strategy. You have to dig holes in the platforms, wait for the unwary lumbering beastie to fall into one, and then fill the hole.

This task is made more difficult by the way the monsters gang up on you; you could be in the middle of burying one as another hoves into view. If you don't finish filling the hole, the monster climbs out but then has to fall through two platforms to die. At later levels, the monsters become quite nasty.

SODOV THE SORCERER

► Spectrum ● Bug-Byte ● Shoot-'em-up ● Peter Luke ● £1.99

OVERALL ● ● ●



Sodov is a game which offers a new meaning to the term Youth Opportunities Program. You, as the youthful player, have control of a sorcerer who is under attack from a mean-looking bunch of local dragons. Thankfully with this program, you have the opportunity of blowing these monsters away at which time they turn into gold coins which can be collected to add to your score.

Plenty of scope to satisfy the twin vices of greed and violence though a plot line which lacks any depth make this a game whose attractions are short-lived.



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ST SOFTWARE – F BEHIND THE HARI

With over 200 ST programs available, Lee Paddon and Geof Wheelwright select some of the best for the first in a series of Your Computer software reports.

The first thing you should ask yourself when buying a new computer is "What do I want to do with it?", closely followed by "Now I know what I want, is there any software to do the job." So many promising machines have met an untimely death because they had no software support.

The ST is the first machine for less than £500 to use a full-blown 68000 chip, so anyone who wants to write software for it will have to make a big investment in time and equipment to master the new chip. Has the ST fallen at this first hurdle? According to Atari, there are now some 200 programs available for the ST with more software houses eager to jump on the bandwagon. In this Report we look at the best of the releases on the machine and see whether they really deliver "power without the price." The survey is divided roughly in proportion to the kinds of programs available; half games, half utilities,languages and business programs.

ST games

The following program has been developed for three computers as yet unassociated with the home computing field – the Atari ST, the upgraded Apple Macintosh and the soon-to-be-released Commodore Amiga. Each has a fast processor, plenty of memory and is capable of high-resolution colour graphics, except the Macintosh, which is black and white. That combination has great potential, which Psygnosis Software hopes to realise in *Brataccas*, a game it calls 'the first interactive video'.

Computer games are a relatively new development for the Mac; in the past they have tended to appear from the back pockets of Apple programmers as an alternative form of amusement at Apple demonstrations and conferences. Just as the Commodore 64, Amstrad and Sinclair Spectrum are the three main targets for home computer software, so the new Fat-Mac, with its faster processor and bigger memory, has gained popularity with programmers developing software on the technically similar ST and Amiga.

Brataccas

Brataccas is one of the most advanced computer games to date, mixing complex graphics with detailed animation and intelligent characters. You play the part of astro-traveller Kyne.

"Kyne is our hero," says the sci-fi documentation. So far as we were concerned, Kyne is also an uncontrollable and erratically-behaved pain in the neck; at first as you try desparately to prevent him jumping off lifts, headbutting walls and drawing his sword just as the meanest-looking characters walk through the door.

The game is similar in appearance to *Castle Quest* on the BBC micro but Kyne is not an explorer; he is a fugitive, accused of a crime he did not commit. Brataccus is a small mining asteroid in the outer Solar System to which you have fled from Earth. It is a self-contained world in which few questions are asked and a corrupt government thrives. It is there you must prove your innocence.

That is about as much information as the manual is prepared to offer. Apart from yourself, there are at least 15 other intelligent characters who go about their business as you explore the planet. Those characters are clearly distinguished from one another, both in appearance and character. You soon learn which ones you can trust, which is more than can be said for the numerous Policemen, Guard Droids and Henchmen who also frequent the bars and passages of Brataccus.

The game is made up of hundreds of rooms between which Kyne can pass. Each room will have at least one exit, be it a sliding door or lift. As your character moves out of one room, so the screen fills with another room as he enters. There are bars, arcade rooms, control rooms and prisons – which soon become familiar – as well as reams of passages to explore. The manual gives away nothing as to your quest; it refers constantly to page 27 for further information on different aspects of the game – "this page is intentionally left blank".

At first the game was really frustrating but as I gained control of Kyne and became familiar with the other characters it became more and more enjoyable to play. The secret is your involvement. Normal computer games involve plenty of moving things at which to shoot but your character is the only one of interest. In Brataccas you get to know the other people, their movements, looks, jobs and, most important, their nature. Once you are accepted it is like a completely new world into which you can escape whenever you want a change from the tedium of reality.

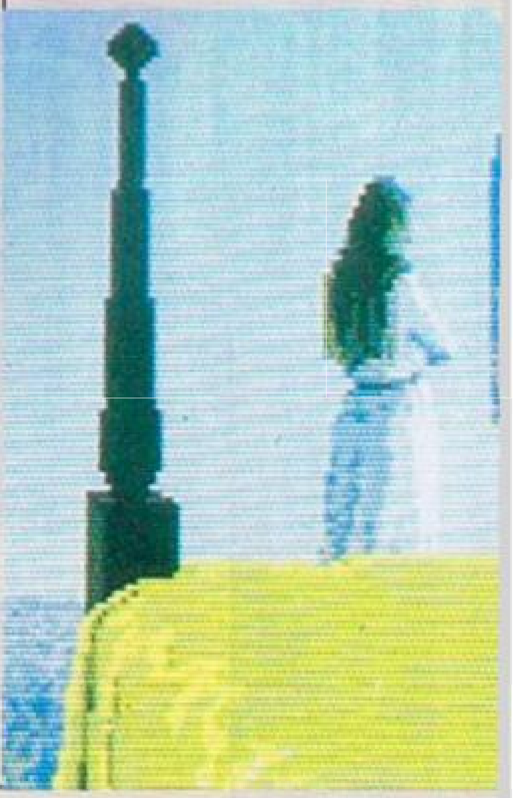
Brataccas seems to be in a category of its own compared to present computer games. It is vastly superior to any game on the BBC, Commodore 64 or Spectrum in terms of graphics, animation, features and the level of programming involved but, given the choice, there are many games on those computers I would rather play when I just want to relax – Brataccas is really hard work. At the £34.95 the company charges to buy it, I am not sure it is worth it.

Another in a similar arcade adventure vein to Brataccas is *Lands of Havoc* from Microdeal. Unfortunately, there the similarity ends. This program is a straightforward conversion from similar versions of the game for 8-bit computers. There is not even a nod in the direction of enhancement by giving you some more rooms – nine you had and nine you have. The graphics are equally bad. Although £19.95 is relatively inexpensive.

Hex

A game which nearly made it to the bin as fast as Lands of Havoc was *Hex* from Mark of

Rainbird's – The Pawn



POWER
DWARE

the Unicorn Inc. Fortunately, what looked superficially like a bad version of Hubert was gradually revealed to be a cunning game of strategy. The arena is a hexagon made from three small hexagons per side. Every time you jump on a hex, it changes colour through a sequence green, red, purple, blue and then back to green. You have to turn the entire arena green, the computer opponent tries to turn it purple.

Abstract games

Like all good abstract games, it is simple to learn but soon has you hooked as you learn more and more tactical wrinkles. There are more than 100 spells to use and they can be combined in one turn in any way you see fit. Towards the end you will find yourself pondering how much magical power you can afford and what spells your opponent is likely to deploy. It is a good, novel game which could easily have you hooked. At £39.95, it is scarcely inexpensive but you are unlikely to find many abstract games to match it.



Colourspace

Defying all attempts to put it in any category, *Colourspace* from Llamasoft will either be a game you will avoid like the plague or buy an ST specifically to use this program. When it first reached our offices in CBM-64 guise, it was firmly believed that Jeff Minter had finally fallen off his Llama. Here was a game so utterly esoteric and far off the beaten track it would surely sink *The Great Yak* and his company out of sight. Now we have to reappraise the program. On the ST, it is really astonishing.

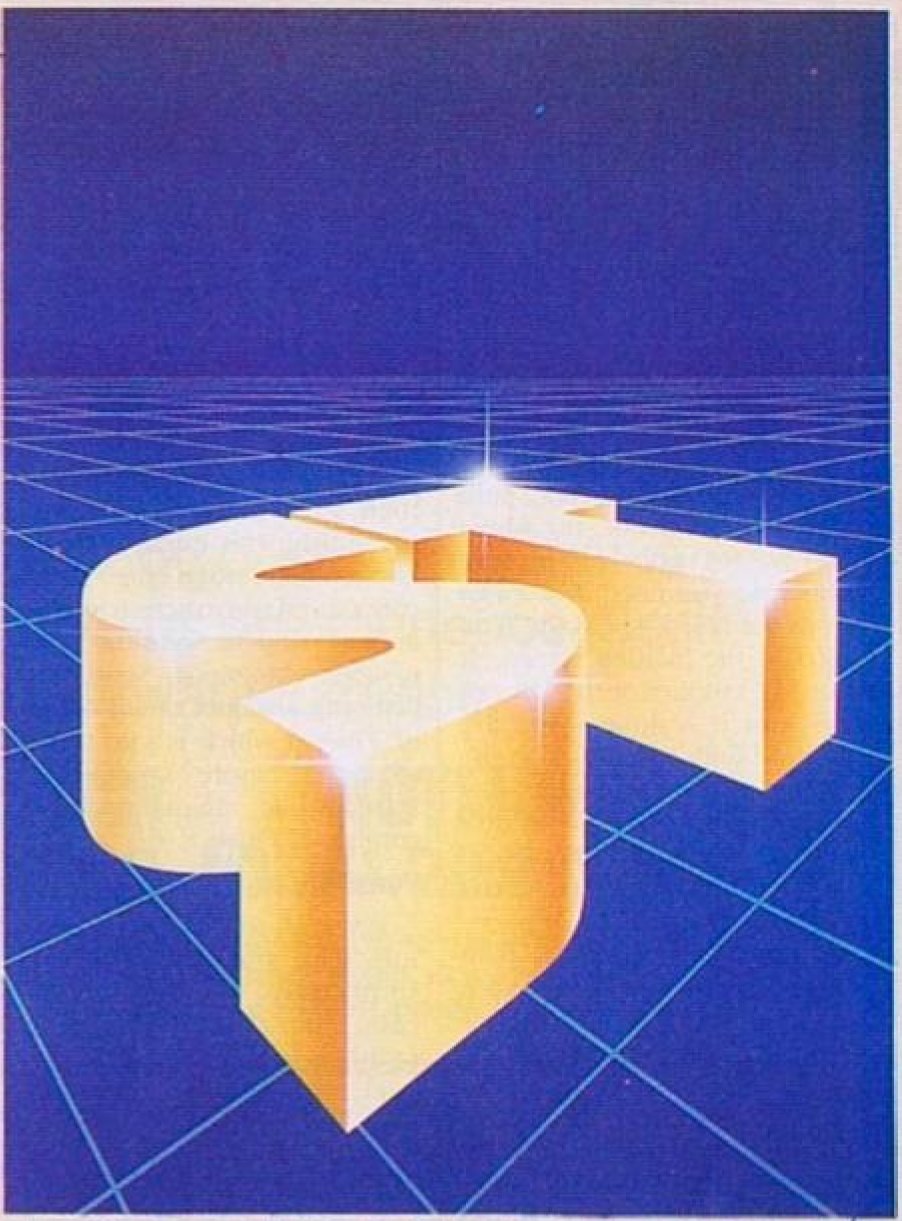
The manual describes the loading process not in the usual terms of menus and double clicking but as "Fire up the stereo with something you're into. Reduce the amount of ambient photons in your immediate vicinity – turn off the light. Grasp the mouse firmly and waggle it about a bit."

Unofficially, Minter will also tell you it helps to be "under the influence"; he does not make it clear whether he means planetary or something slightly more herbal, but you get the general idea.

As you "wiggle the mouse around a bit", beautiful patterns appear on your monitor. It does not matter how clumsy you are, or how unartistic – somehow Colourspace catches your drift and puts up exactly the kind of pattern you had in mind. There are loads of pattern pre-sets with which you can play, as well as some backgrounds. Each pattern has a "weight" and "inertia" to it.

Obviously, the more complex a pattern, the longer it will take to draw, so if you move the mouse quickly, the pattern will break up as the program becomes overloaded, as it is having to cycle every pixel on the screen through its appropriate colour sequence; even the ST has its limitations.

After examining all the presets you can begin to experiment with them. You can put in more symmetry, change the



colour sequence or change the rate of fade. When you become really brave, you can start to change the pre-sets. It is not so difficult as all that and is well-explained in the manual. At £19.95 it is at the inexpensive end of the ST software range. If you want to do something different with your ST, it is difficult to recommend the program highly enough. It will attract a whole breed of people into using computers who might have thought of them as no more than expensive doorstops. Might we see DJs junking their "sound to light converters" in favour of one of these?

Adventures

One of the most readily-available kind of games on the ST is adventures. Infocom has gone for the ST in a big way – 19 of its famous text adventures have now been published in ST format. Trying to recommend one from the superb range would be difficult. At the moment only five are available directly in the U.K., at £22.94; the others are available only from importers like Silica Shop at around the £40 mark.

Of the U.K. games, *Hitchhikers' Guide to the Galaxy* and *Planetfall* are particularly notable. Hitchhikers has been reviewed recently on other formats and follows closely the plot of the Douglas Adams book of the film of the radio series of the tee-shirt.

Planetfall

Planetfall is a text-only adventure. You are seldom required to kill anything; you will rarely have a chance to cast magic spells or banish demons. What you have is superb descriptions. You also have pleasant touches of humour, real characters, and the kind of plot of which Agatha Christie at her most devious would be proud. You start comfortably enough in a spaceship with only a bad-tempered superior officer and a mop and bucket to cope with. The trouble is the spaceship is just about to blow up. The passer – command interpreter – is fairly flexible

continued from page 53

and can take two commands at once, or a series of directions.

If you are any kind of fan of adventure games, you should buy at least one Infocom title. They are probably the best of their type and will never disappoint you.

The Pawn

That is all very well, you may think, but I bought an ST for astounding graphics, pull-down menus, icons, the whole bit – not for text adventures. In that case you need *The Pawn* from Rainbird at £24.95. You start at the loading screen. It has 322 colours on it. Do not ask how it is done – you are allowed only 16 colours on the screen at the same time – or someone will start to mutter obscure technical phrases at you. This adventure game has pull-down menus and 31 pleasant graphic screens. The pull-down "scrolls" contain such goodies as load/save, printer spooler, large text option and can even re-touch the colours.

What The Pawn sets out to do is send up, with as much reverence as possible, other adventures. It is not a "Bored of the Rings" type game; the humour is a little more subtle and you can play the game entirely straight if you prefer. Magnetic Scrolls, which wrote the program, has gone out of its way to make the passer as user-friendly as possible. If you muck up a command, it gives you a chance to re-edit it and enter it again. All objects have the physical properties they exhibit in the real world and the idea is to allow the player as much freedom as possible.

The theory goes that in some adventures, when you are allowed to do something, it is normally because it is important to the game. Pawn is different. Do not necessarily attach any significance to the fact that you can tie your shirt over your eyes. That flexibility is necessary, as you must be given as much freedom as possible. There is no simple way to win and you do not complete the adventure in any one particular fashion.

At a fairly early stage you will realise that you are not the adventurer. You will meet a fellow wandering round the place. He is a bit thick and will understand only simple verb/noun constructions – a jibe at other adventurer passers. You can help him with his trek if you wish. There is even a princess in a tower to be saved, although she is a bit of a pain later, following you around, asking whether you like her dress and so on.

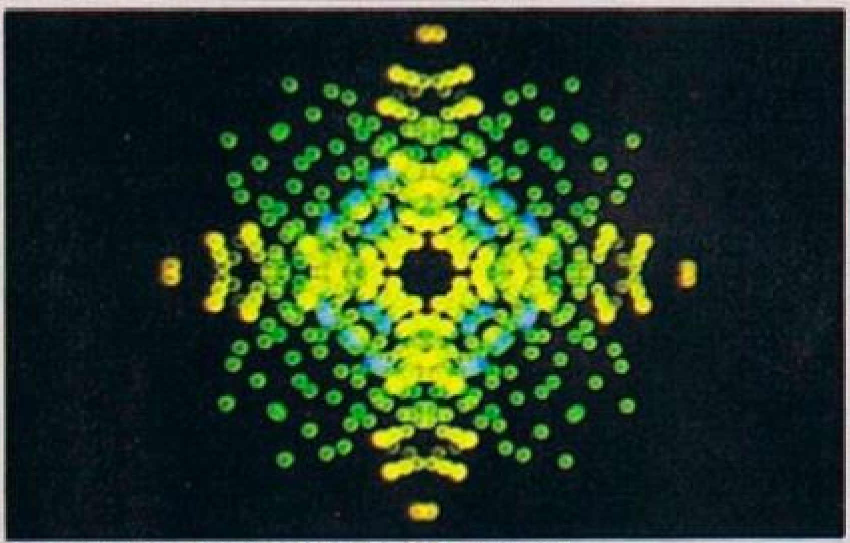
Perhaps if you have never tried a text-based adventure previously, this might get you hooked, although the fairly convoluted construction means it may not be one for the novices. Magnetic Scrolls is planning a sequel called *Guild of Thieves* which is said to be somewhat more straightforward, while maintaining the goodies of *Pawn*.

Perry Mason

Perry Mason is a text adventure with graphics. It is, not surprisingly, about a murder case. Your client is found next to the body of her very rich husband with a smoking revolver in his hand – scarcely a promising start. You win by getting your client off the hook. You score bonus points if you make the real murderer break down and confess. In true Perry Mason style, from the first page you are wading around knee-deep in red herrings. Like any true thriller, the climax is the trial room. You can cross-examine witnesses, protect your witnesses from unfair cross-examination, and save your client from a nasty jolt – like 20,000 volts.

Sundog

Still on import from Silica Shop at £39.95 is *Sundog* from FTL games. It is a hybrid adventure/arcade game. You start in true tradition in a ship you do not know how to control on a planet where you don't know anyone with a quest you have no idea how to complete – well, you wouldn't want it to be easy, would you?



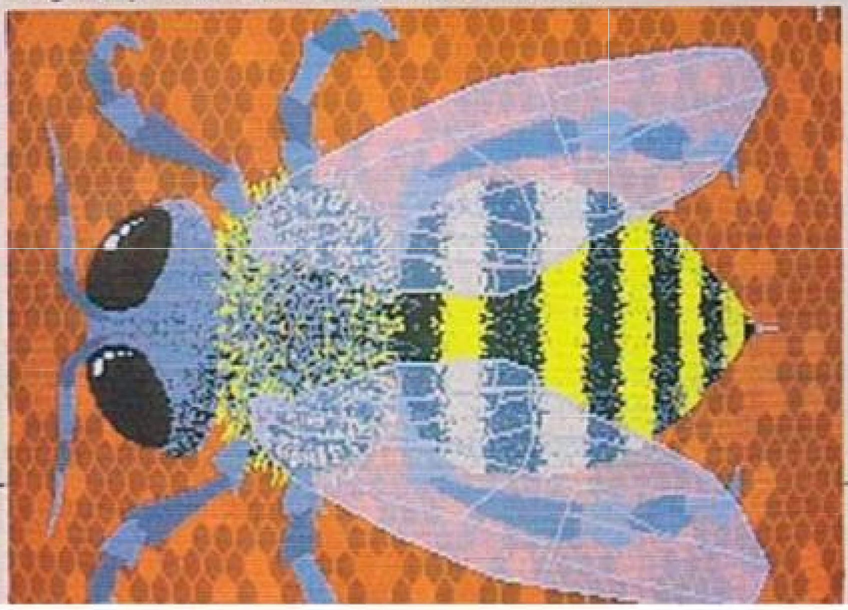
Colourspace from Jeff Minter's Llamasoft.

The game is under mouse control, using menus and icons. When you get into conversation with another character you have a list of responses, ranging from the tactless to the plain grovelling. The manual gives a few clues about control, excepting only how to manipulate the mouse.

There are the usual problems associated with everyday inter-galactic life – muggers, pirates, traders who will try to rip you off, beggars and the usual low life you find in any space port. One tip – don't fall asleep outside your ship or a better class of hotel – you will be cleaned out.

The graphics are very pleasant and the way the game is controlled shows good use of the machine. It is not a quickly-botched conversation job but a game designed round the machine.

Degas by Batteries Included via Ariolasoft.



ST paintboxes

The first is something called Neochrome – a full colour 'art and design' program which is actually included in the price of the new £399 Atari 520STM. At any one time you can access to 16 colours selected from a possible 512 in the ST 'palette' and these colours can be used to paint, spray, fill, line-draw, write text and sketch in 'pencil'. The screen display can also be 'toggled' as well so that you can either work on half the picture while looking at your 'drawing tools' OR you can expand the picture to fill the whole screen and then toggle back and forth between it and the 'tools' screen.

Degas

But an even better colour paint system for the ST – which unfortunately isn't free – is available from Ariolasoft. It's by Canadian software house 'Batteries Included' (the same people who wrote the well-known Paperclip word-processor for the Commodore 64 and 128) and goes under the name Degas (as in the painter – not the slang method of describing a can of petrol).

Degas offers the use of 500 colours – but works in all three Atari screen modes – including the high-resolution 640 x 400 pixel black and white. Colours, of course, aren't available in the latter screen mode, but you will see some of the highest resolution graphics available on any sub-£1000 micro.

Again, this program allows you full switching between the control screen and the screen on which you draw. I found this

continued on page 56

Continued from page 54

a distinct advantage over the MacPaint style of screen-drawing where you can see only a portion of the complete at a time.

All the major drawing tools you have come to expect are there – including draw (paintbrush), point (pencil), line, K-line (continuous lines), shapes (circle, disc, frame, box and polygon), fill, text and mirrors. There are also some welcome additions to the regular collection of drawing tools. Among these is an 'airbrush' – which allows the flow of paint to be adjusted on three levels, a 'slow-draw' facility for fine work and an adjustable shadowing feature.

The software also supports a healthy number of fonts for the text mode and lets you create and edit your own fonts. Printer drivers for getting your graphics off screen and on to paper are equally powerful and are set with a 'default' set-up for the Epson MX-80.

Finally, Degas also includes a utility for converting your Neochrome files for use with Degas – so that even if you don't buy Degas right away, all your Neochrome creations won't be lost when you do. At £34.95 – please check final price with Ariolasoft – this program is well worth considering and makes a welcome addition to anyone's ST.

Easy draw

Another package in a similar line is *Easy Draw* from Migraph. What makes the program exceptional is the way the various layers you put down interact with each other. Despite the fact that two objects overlap, they remain very much separate objects, and if you do not like it, you can pick up that figure, move it around, change its shape, and so on.

You can also cement components together to form larger forms which you can then manipulate in the same way as if it was a simple curve, circle or line. Thus you can build a series of complex building blocks which you can then move around.

By using the zoom in and out facility, the package becomes a powerful drafting aid. It is not an art program and does not pretend to be. What it sets out to be is a powerful drafting and drawing program. You could use it for producing plans, designing letterheads, Christmas cards and so on. It can drive the usual range of dot matrix printers. It can also be used to produce a "slide show" of drawings displayed on the screen in rotation but its fairly primitive colouring and brushing facilities make a program like Degas more suitable for this kind of work.

ST languages

On to more serious matters. There are no fewer than 26 languages available for the ST, in addition to the Basic and Logo bundled with the machine. If you are a slave to Basic but need more speed than the Atari can give you, Fast Basic-M could be what you are seeking. The price of £99 might put it out of the range of the home user and into the class of development tool for a software house but it seems that the kind of speed of which this compiled form of the language is capable may well be difficult to beat.

The number of C compilers for the Atari ST is rapidly approaching double figures, as is the combined number of other language compilers. That means the user who wants to leave the relative safety of interpreted Basic and Logo is faced with a difficult decision of which package to choose. Costing more than £50 on average, an incorrect choice means an expensive mistake.

Lattice C

Metacomco has released Lattice C and MCC Pascal, previously available on other 68000 machines, for the ST. Each comprises two discs and a book-type manual. The discs contain a program text editor, compiler, linker and the library source code – everything you need to write compiled programs.

The Metacomco editor, called ED.TTP, is a screen editor and does not use any of the facilities of Gem. It has all the basic facilities you would expect to find in an editor, though some have to be achieved with a combination of commands – for instance, block moves have to be done by a block copy followed by block delete. The most annoying problem is that the block markers, which cannot be in the middle of a line, are not shown visibly and disappear easily. If you do not like working with ED and would prefer a window-based editor, 1st_Word will fit the bill.

The Lattice C compiler is very complete. Most compilers are based on the Kernighan and Ritchie standard, defined in their book *The C programming language* which is the C 'bible'. Lattice C is not a subset of K & R C, like many of the others, but a superset, giving several very useful extra features. The few restrictions it has are minor and in the interests of good programming practice anyway. The extra features include the definition of up to four folders in which to look for the header files, which means that you do not have to clutter your main directory, and nested comments, for removing large blocks from the code temporarily.

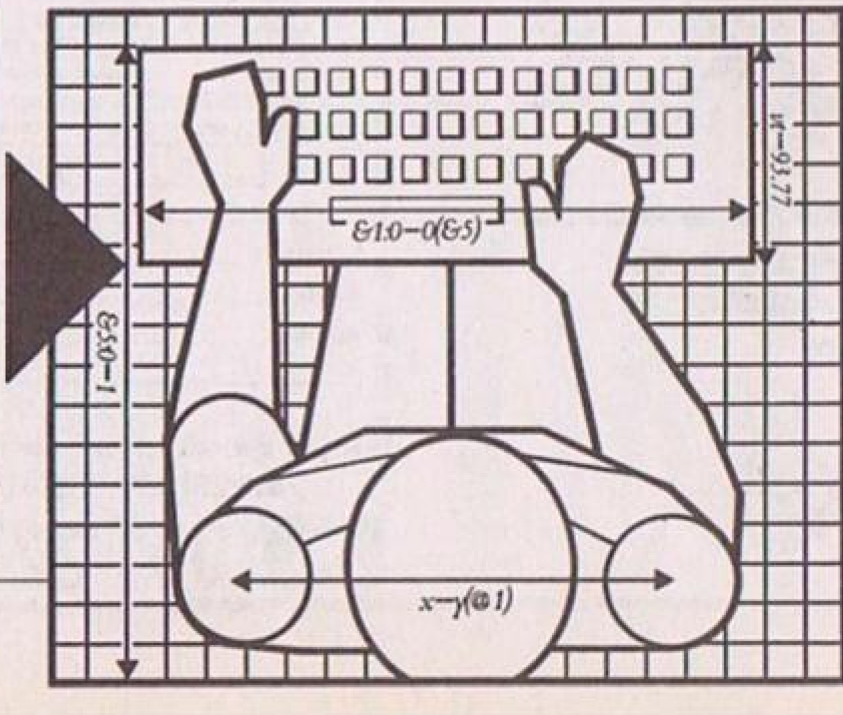
No C is complete without a library of functions for input, output and general purposes. Metacomco provides all the standard functions as well as full floating point facilities, something few others do. In addition to the C library, there is a Gem library which gives access to the Gem VDI and AES functions. Lattice C will be bought by many software developers to replace the bug-ridden DRI compiler. The conversion will not be so easy as they may think, as they differ slightly in the way they work internally. DRI, Gem and TOS all use 16-bit integers, whereas Lattice uses 32 bits. Through the use of portability macros that is made easier but is not just a recompile. Once the conversion is done, however, the Lattice provides a better, and supported, environment.

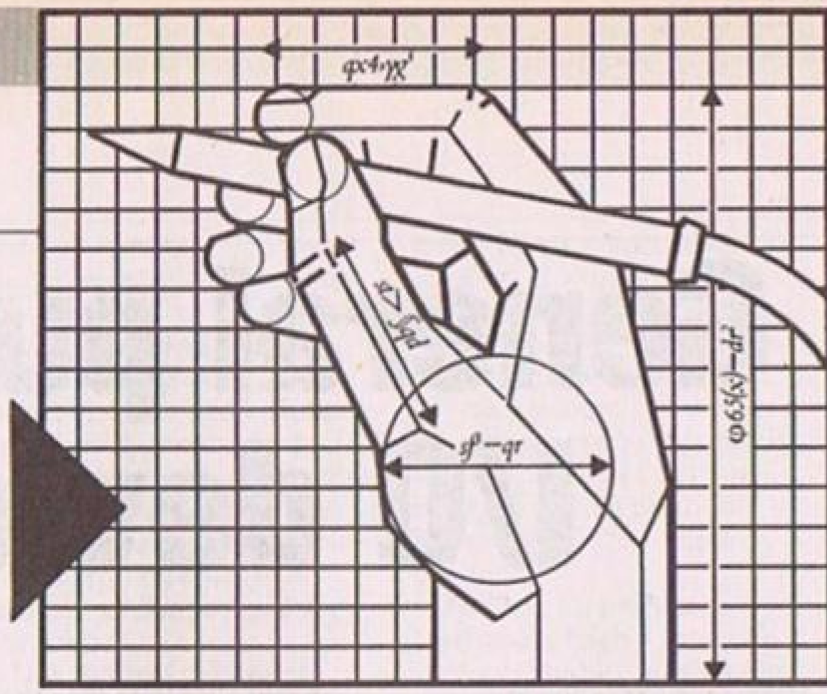
The C manual gives a very comprehensive explanation of the differences between Lattice and K & R C, how the compiler goes about its optimising job, and a description of each standard library function. The Pascal manual includes a full technical reference to the language. Neither manual is intended to teach you the language but they tell you all you need to know about the Metacomco implementations and how to use them. If you do not already know the language you want to use, you will need another book. You will also need more information if you want to use the Gem libraries.

MCC Pascal

According to the manual, the Pascal is a full implementation of the ISO standard for Pascal. That means that a program written to this standard should be easily portable to and from the Atari. For those who want more from the Atari, and lose the portability of the standard, a library of Gem functions is provided. Pascal is a trendy language, especially among the structured language lobby, and this single-pass compiler will satisfy their requirements.

A good compiler is useless





without a good manual and Metacomco has produced two reasonably complete, half-inch thick books. Each manual includes details of how to use the relevant compiler, the editor and the linker, as well as fuller error messages to complement those given by the compiler, some sample programs and a list of the Gem library functions.

Lattice C will be used by professional-quality implementation, and by casual users who want the best available. Many people, however, will prefer the friendliness of the slightly limited GST C. MCC Pascal will be used by people who want it just because it is Pascal. In terms of price, the compilers are inexpensive when compared to similar packages for other computers – Lattice C for the IBM PC is £375 – and, considering the quality, are very good in comparison with other compilers for the Atari ST.

Lattice C Compiler (£99.95 inc. P&P) and MCC Pascal (£89.95 inc. P&P) for the Atari ST. From Metacomco plc, 26 Portland Square, Bristol, Avon BS2 8RZ. Telephone 0272 428781.

Business applications

Atari claims that the ST can be used in small businesses. To serve that market there is a plentiful supply of word processors, spreadsheets and databases. 1st Word at £49.99 from Atari is a word processor which sets out to obtain the most from the ST. Almost everything short of typing-in the text can be done from the mouse and icons.

All the usual word processing functions are available from drop-down menus. The program allows you to select various character sets and typestyles. Transferring that to the printed page is obviously somewhat tricky, so the program has a list of printer drivers with which it can cope. You have a text window which can be moved around, using the mouse, to anywhere in the document.

Depending on how many other menus you have on the screen, you can also steer the text window round the screen and choose its size.

Laser base

Another in the standard suite of small business programs is a database. Laser Base, from Laser Software at £99.99 is a non-relational – i.e., single file – database, designed to use the WIMP environment to the full. Anyone who has used MacPaint or MacDraw or the Digital Research ST programs will know how the program works.

The idea is to use windows and icons to simulate "normal office practice". The theory is that non-computer-literate people will be able to use the program with a bare minimum of training because it simulates the real, non-computerised equivalent.

You draw your input from text boxes, numeric fields, data fields and so on. The total space available is a 20 x 20 screen field which can be scrolled around at will. You can also alter the input fields even while data is in use. Searches can be conducted on up to 100 levels (conditions). Without using the database for a long time, it is difficult to tell whether it could cope with all the problems you are likely to face but it looks as if the program could be a real help to anyone who has never used a database any more sophisticated than a card index box.

A large compiled program is usually written in small manageable sections which are compiled individually and then linked to make an executable program. Metacomco supplies a linker from GST, another British company, which allows you to do that. The fact that they are not by the same company could cause difficulties, as shown when you mis-type a function call. If you call a routine accidentally, e.g., frontwindow() with a capital letter, e.g., Frontwindow(), the compiler assumes they are diffierent, being case-independent, but the linker assumes they are the same. That conflict causes the linker to fail, with no good explanation given.

One problem from which both the compilers and linker suffer is the lengthy command line necessary to operate them. A typical command could be more than 60 characters long with the header folders defined and when you have to repeat ti often it is easy to make mistakes. GST solved this problem for its C compiler with a Gem-based 'shell'. You select the options you want with drop-down menus and the whole operation is very smooth. Metacomco says it is hoping to produce a similar shell soon but for the moment you must tolerate with the command line.

M-Copy

Finally, there are utility programs. Doubtless Atari would claim that the TOS environment is so comprehensive and user-friendly that you should not need such things but, despite that, there is a thriving market in programs designed to make life that little bit easier.

Microdeal has a series of utilities licensed from an established U.S. ST software house, Michtron. *M-Copy* is a disc copying program. At £49.95, it is aimed allegedly at people who need to copy discs in commercial quantities rather than one-offs but it failed to copy most of the discs with which we tried it, presumably due to the software protection techniques employed by the software houses.

The *Utilities* disc from Microdeal at £39.95 claims to be the ultimate disc zap program. What it seeks to do is look at disc contents in details, to try to recover as much data as possible from discs which become corrupt. Since the ST and the 3in. medium appear very robust, it would seem that there is very little need for this kind of program. For business users, however, if it should save 10 hours' work or so on one disc, the investment would be worthwhile.

Toolbox

ST Toolbox from Paperlogic is a difficult program to pin down. It is designed to produce a different environment from TOS, more suitable to people who do not want the user-friendliness of a WIMP environment and want to enter complex command line syntaxes or a whole bunch of commands. It also performs commands not available in TOS, such as performing string searches in disc files and word frequency analysis. If you are allergic to mice but like the power of the ST, this is the program for which you have been waiting.

The future works

For a machine which has been widely-available only for six months, there are some remarkable programs for the ST. In some ways, the new chip has been an advantage – it has not suffered the usual avalanche of cheap and nasty conversions. Most of the software is somewhat more expensive than disc-based software has been to date but prices may fall as competition increases. That said, most of the software is of such outstanding quality the extra price seems worth it.

Your Computer will certainly keep its eye on the ST and bring you the latest news on software releases. Anyone who sees this software running cannot fail to be impressed with the quality of the machine, which seems to leave its 8-bit brethren as far behind as the Spectrum/Commodore/BBC did their black and white predecessors. We have seen the future – and it works.

General purpose I/O devices

Dick Sargent surveys the I/O device market – from light pens to modems, from plotters to mice.

One of the disadvantages to home computing is that once you have overcome the initial wonder of it all you are likely to want to do more with your micro than sit and gaze at a blank screen. That inevitably means parting with more money. Even something as fundamental as playing *Space Invaders* usually demands the addition of a joystick to get the best from the activity. Here you are into the peripherals market, involving the use of I/O devices, and there are numerous add-ons for all the popular home micros, embracing almost all the "things to do with a micro" yet devised.

Few I/O devices work without supporting software, which is a trap for the unwary. The exceptions to the rule are the humble joystick of the switched variety and the standard text printer. The controlling software for them is invariably contained in the computer ROM and no additional software is necessary to drive them. Other devices, however, are only as good as their supporting software.

Input devices are largely associated with the graphics capabilities of the micro and represent a sector of the market which is expanding rapidly. Everything from creative art to the most sophisticated engineering design is catered for, with the most impressive packages reserved for the Macintoshes and Apples.

The BBC micro, however, is well-supported, with several companies expecting the serious user to buy graphics tablets and CAD packages rather than lightpens and analogue joysticks. That is due as much to the existence of the analogue ports and the high resolution on the BBC as to its image as an educational tool. Spectrum and Amstrad computers, with lower resolution and no spare ports, are limited by the need for black box add-ons and that tends to mean that their input devices are less sophisticated. According to the degree of accuracy you need or wish to achieve, the choices of input device are:

Joysticks. a) The switched or digital variety usually gives the equivalent of nine keypresses, with eight positions and one fire button. When used as an extension of the keyboard it does not need software. Its main use is to give greater speed of operation for arcade games players.

b) The analogue joystick is a smoother operator altogether, allowing 360 degrees of movement, interpreted by software. Capable of producing recognisable, albeit crude outlines on-screen, it is much more accurate than the digital version. It is also more expensive.



Trackerballs. As smooth to use as analogue joysticks but more accurate because they can implement movements too small to be created by joysticks. The term "small footprint" sometimes used to extol the virtues of these devices means simply that trackerballs stay in one place, so if your computing area is restricted, cluttered and disorganised – i.e., normal – you will be able to use a trackerball where you might not have room to operate a mouse.

Mouse. Mobile equivalent of a trackerball but more fashionable at the moment, probably due to the up-market image created by the use of mice on the Atari, Amiga and the like. Demands co-ordination of hand and eye and is efficient when picking options from on-screen menus, although still not the best device for those requiring accurate drawing. AMS has had a good deal of attention for its AMX Mouse for the BBC but there are others, such as the BBC Mega-Mouse and the Commodore MS2000, both from Wigmore House and both worth considering. The Kempston mouse for the Spectrum is a neat, efficient unit. Mice are largely available by mail order which, since they are only as good as the software packages they accompany, could be a problem.

Lightpens. Available for most micros, lightpens "draw" on screen by picking up light generated by the cathode ray tube of the monitor or TV. You can pay what you want for them – the more expensive the equipment, the better the results. A Spectrum lightpen used on a television screen will give much less accurate results than a BBC pen and a high-resolution monitor. Many variables affect the performance of lightpens, e.g., thickness of screen glass, the resolution and graphics capability of the micro and even the level of light in the room in which you are working in, not to mention the inherent components of the lightpen. The standard of software is very important and will, of course, affect the price you pay.

Jointed arm tracers. Based on analogue-joystick technology, they consist of a stylus attached to two hinged levers which move over the drawing to be traced, building-up a copy on the screen. Competition from superior graphics tablets has made them less attractive but they serve particular applications where existing artwork needs to be transferred to the micro screen.

Graphics tablets. The graphics tablet and its smaller brother, the graphics pad, is an electronic drawing board which interprets freehand design created with a stylus. The resolution which can be achieved is often outstanding, with 150 separate points per inch being possible. Prices

range from around £500 to £70, according to sophistication required.

Video digitisers. They take you into the realms of real-life scenes translated via camera on to the micro storage and display system. The Commotion Snap camera (EV1) or an interface from Watford Electronics which allows you to use a video camera will cost in the region of £100. Colne Robotics will sell you a complete system for several more hundreds – or you could just visit your local funfair or seaside resort and buy a printout for £1 or two.

General analogue input. One way of disposing of an outdated micro – turn it into an expensive thermometer by hooking it to an analogue port which reads voltages from any number of devices and puts the results on-screen in graph form. Essential for budding physicists.

Not all input devices are devoted to visual effects. Sound is catered for, too, with piano-style keyboards which already exist for Spectrum 128s, BBCs, Commodores and, before long, for Amstrads. Use of them is enhanced, of course, by sound effects other than those generated purely by the micro, which brings us neatly to section two of the Buyers' Guide for output devices.

Midi stands for Musical Instrument Digital Interface and is the fashionable way to turn your micro into the poor man's Status Quo, by attaching a synthesiser, drum-kit simulator or similar noise-maker. These add-ons may or may not require a black box Midi interface, depending on which micro you have. Commodore 64s, BBCs and the older Spectrums all need black boxes but the Spectrum 128 and the Atari 520 are ready prepared for any musical experience which peripheral manufacturers can devise. In 1986 there is likely to be a boom, if you will forgive the

Input Devices	Spectrum	RRP	Amstrad	RRP	Commodore	RRP	BBC	RRP
Joystick – Switched	RAM INT + S/S	£19.90	Amsoft YJ2	—	Cheetah 125	£8.95	Altai 318	—
– Analogue	No		No		—		Flight Electronics	
Keypad	128-Pad (10)	£19.95	No		No		Voltmace Delta 14B (11)	£14.95
Infra-Red	Cheetah	£19.95	—		No		Yes	
Trackballs	No		—		—		Analogue (3)	£24.90
Mouse	AMX Kempston Digimouse (2)	£69.95 £69.95 £34.95	AMX	£79.95	Megamouse (3)		AMX CTS Mouse Megamouse (3)	 £59.90 £68.20
Lightpens	F.E. Electronics (4) Lightwriter (15) dkTronics	£29.90 £12.99 £19.95	Amsoft dkTronics Electric Studio DART		—		Watford Mk II	£25.00
Arm Tracers	—		—					
Graphics Tablets	—		Grafpad II (14)	£69.00	Grafpad II (14)	£59.50	Grafpad II (14) Cumana	£59.50 £49.80
Video Digitisers	No		No		Commotion EV1	£113	Watford	£95.00
Sound Sampler	Digital Sound (15)	£50	—		Commotion EV1 Digital Sound (15)	£113 £50	Commotion EV1	£113
Analogue Input	EPROM Services (12)		No		Onboard		Onboard	
Music Keyboards	HCCS Ltd (5)		—		Yes		Music 400 (7)	
Midi	XRI Systems (16)		—		Yes		Music 200	POA
Sound Chips	EPROM Services dkTronics Cheetah	 £10.95	Onboard		Onboard		Onboard	
Drum Synth	Cheetah Drumkit				Com-Drum (15	£29.99		
Speech Chips	dkTronics Cheetah	 £24.95	Amsoft dkTronics		Cheetah	£24.95	Cheetah	£24.95
Serial RS232	Interface One		Amsoft Skywave KDS (13)		Cheetah Interpod	£59.95	Onboard	
Modems	VTX5000						Magic Modem Nightingale Miracle WS2000 Voyager 7 (9)	£99.95 £119 £153.75 £79.95
	Standard Modems (such as those in the BBC column can be connected to the Amstrad & Commodore via a proper RS232 interface. Beware of unauthorised Modems. Voyager is currently awaiting its BT approval.							
Parallel Centronics	dkTronics Kempston		Onboard		RAM Sprint 128 Cheetah Interpod Supergraphix (17)	£29.95 £59.95 £69.95	Onboard	
Black-Box I/O	EPROM Services Robotek (15)	 £29.99	KDS (13)		—		Numerous educational and Industrial boards	
Plotters	—		—		—		Plotmate (8)	£300
Specialist Printers	Alphacom Rotronics (14)	£30 £199	DMP 2000		Commodore		—	
Colour Printers	—		Okimate 20	£299	—		—	
★ ★ Always check prices prior to ordering and verify if VAT and post and packing is inclusive ★ ★								

Continued from page 59

expression, in this type of add-on, which can cost anything from around £50 to several hundreds, according to how seriously you take it.

Sound chips. They appeared largely because of the inadequate sound facility on some of the early micros, notably the Sinclair machines. They are still available from companies such as dK'Tronics but the advent of the 128 with its real sound attribute will probably trigger their steady demise.

Voice chips. Conversely, they have not yet come into their own, most examples until now producing sounds which closely resemble a poor imitation of a robot suffering from terminal rust. You can now mortgage your soul and your chances of an Amiga by buying Kenneth Kendall for the BBC but despite research into their use in helping the handicapped, voice chips are still a development looking for an application.

Serial output is required for all modems, some printers and some robots. Internal software and a cable transmit the signals from the micro to the peripheral but is an option available only on the BBC as a built-in feature and only for selected peripherals. The Commodore 64 has a non-standard serial output which effectively means that, left to itself, it will communicate only with Commodore-manufactured disc drives and monitors. If serial output is needed on other micros, it is achieved by an RS232 interface for the specific machine.

Parallel output, on the other hand, is used by the Amstrad computers and is available for the Spectrum only via interfaces. Again, software and cables are involved and are used mainly to drive a centronics printer.

Printers, without which no programmer, writer or aspiring artist can function, offer a choice between the lost-cost Brother thermal printers, the middle range dot matrix machines which are now almost all adopting the Epson standard, and the expensive, near letter quality printers, which include the daisywheel range.

In each of those price categories you can find colour plotters, which plot lines and graphs, but can often produce listings as well, and colour dot matrix and thermal printers, useful for art and design packages. The ink-jet printers used for fast, top-quality printouts are strictly for the wealthy and laser printers represent the newest and least affordable phase of printer technology, since they cost something like £3,000.

Black box/interfaces. These devices tend to incorporate relays and are used to run low-voltage motors or, with mains-rated relays, can put household appliances under computer control. Even some of the applications which have so far failed to generate mass appeal, such as robotics, are well-serviced in this area, with numerous arms, buggies and turtles which run from black boxes, available from a number of companies. The black box costs between £20 and £70 but the ultimate cost may well be greater because you need something to plug into it.

Robot peripherals. Prices for this kind of hardware tend to be high because it demands a fair degree of engineering expertise to design; and the market is small, concentrated largely on educational establishments. Even if you ignore items such as the Colne *Armdroid – a snip at around* £600, give or take a few digits – and the Valiant or Jessop turtles you still need to find around £100.

Commotion is the exception to the rule, its Beasty arm affording enthusiasts the chance to build a robot piecemeal. The IGR Zero2, the most expensive of the Movit range, and the Clwyd Technic Trekker are all at the cheaper end of the buggy/turtle market and both FischerTechnik and Lego sell DIY building kits which can be interfaced to micros.

It is an area where design is ahead of demand and the trade has been living in expectation of a robotics phase for two years. When it happens, there will be plenty around from which to choose.

RAM ELECTRONICS,
Unit 16, Redfield Ind. Pk.,
Church Crookham,
Aldershot, Hants GU13 0RA
Tel: (0252) 850085

NIDD VALLEYS MICRO PRODUCTS LTD,
Stepping Stones House,
Thistle Hill,
Knaresborough,
N. Yorks HG5 8JW
Tel: 0243 864488

WIGMORE HOUSE LTD,
32 Savile Row,
London W1X 1AG
Tel: 01 734 0173

F.E. ELECTRONICS
163 Huntingdon Road,
Cambridge CB3 0D8
Tel: 0223 353355

HCCS LTD,
28 Hitchin Street,
Biggleswade,
Beds
Tel: 0767 318844

X-DATA LTD,
750/751 Deal Avenue,
Slough Trading Estate,
Slough,
Berkshire SL1 4SH
Tel: 0753 31292

HYBRID TECHNOLOGY

LINEAR GRAPHICS,
28 Purdeys Way,
Purdeys Industrial Estate,
Rochford,
Essex
Tel: 0702 541664

MODEM HOUSE,
70 Longbrook Street,
Exeter,
Devon EX4 7AP
Tel: 0392 213355

SINCLAIR,
Mail order to Camberley

VOLTMACE LTD,
Park Drive,
Baldock,
Herts SG7 6EV
Tel: 0462 894410

EPROM SERVICES,
3 Wedgewood Drive,
Roundhay,
Leeds LS8 1EF
Tel: 0532 667183

KDS,
15 Hill Street,
Hunstanton,
Norfolk PE36 5BS
Tel: 04853 2076

GRAFSALES LTD,
Unit 8,
Derby Works, Carey Place,
Watford,
Herts WD1 2LR
Tel: 0923 48222

DATEL,
Unit 8,
Fenton Industrial Estate,
Dewsbury Road, Fenton,
Stoke-on-Trent
Tel: 0782 273815

XRI SYSTEMS,
10 Sunnybank Road,
Wylde Green,
Sutton Coldfield B73 5RE

SCREENS MICROCOMPUTER,
Main Avenue,
Moor Park,
Northwood,
Middlesex
Tel: 09274 20664

WATFORD ELECTRONICS
250 Lower High Street,
Watford
Tel: 0923 37774

COMMOTION,
241 Green Street,
Enfield,
London EN3 7SJ
Tel: 01 804 1378

CHEETAH,
1 Willowbrook Science Park,
Crickhowell Road,
St. Mellons,
Cardiff
Tel: 0222 777337

KEMPSTON,
Unit 30,
Singer Way,
Woburn Road Industrial Estate,
Kempston,
Bedord MK42 7AF
Tel: 0234 856633

dK'TRONICS,
Shire Hill Industrial Estate,
Saffron Walden,
Essex CB11 3AQ
Tel: 0799 26350

AMS,
Freepost,
Warrington WA4 1BR

AS EASY AS 1-2-3

VIP PROFESSIONAL

AN INTEGRATED SPREADSHEET PROGRAM

Probably the most impressive program to have been released so far for the Atari 520ST. VIP Professional is an extremely easy to use, integrated spreadsheet, database and graphics program which is identical both in features and commands to Lotus 1-2-3™. The same spreadsheet analysis, information management and extraordinary business graphics are all combined in one easy to learn, affordable package. What's more, VIP Professional not only has all the features of 1-2-3™, you can also type the same commands to do the same things. Or, better still, if you have the ROM version of GEM on your ST, you can use a mouse to make it even simpler! Probably the most surprising feature of VIP Professional is not its total compatibility with Lotus 1-2-3™, nor its ease of use with the GEM environment, but its price. Lotus 1-2-3™ for the IBM PC AT costs £395 (+VAT £454.25), whereas VIP Professional for the ST is a mere £169 (+VAT £194.35). That's less than HALF PRICE!

FOR THE 16-BIT ATARI ST PERSONAL COMPUTER

VIP PROFESSIONAL

VIP Professional is an extemely easy to use integrated spreadsheet program for the home or office. To give you the best program possible on your Atari ST, VIP professional integrates the three essential applications of Lotus 1-2-3™ with the smart face of Jazz™. VIP requires only one disk drive to operate and also works with a hard disk drive. It is compatible with both monochrome and colour systems.

INSTANT HELP

VIP Professional has Instant Help at your fingertips. At your whim, you can find more information about what you are working on, or more about other parts of the program.

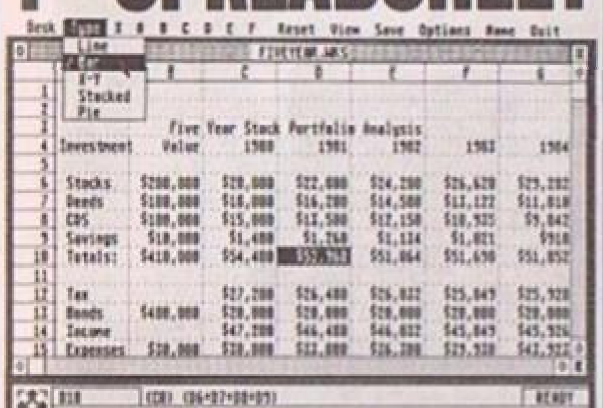
OTHER FEATURES

1) VIP Professional calculates to a full 300 digits against Lotus 1-2-3™ which only calculates to 100 digits.
2) VIP allows for 256 Query Fields against only 32 allowed by Lotus 1-2-3™.
3) VIP GEM version will have a complete mouse interface, capable of icons, drop-down menus, dialog boxes, different pointers, small bars, etc. Not incorporated in Lotus 1-2-3™.
4) VIP allows different fonts and provides a grid for cells which can be turned on and off. Not incorporated in Lotus 1-2-3™.
5) VIP supports greater memory and larger spreadsheets than Lotus 1-2-3™ version 1.
6) VIP graphs can be viewed at the same time as the worksheet. The pie charts can be exploded.
7) VIP is currently being written for the IBM, AMIGA, ST and APPLE MACINTOSH.

GEM VERSION

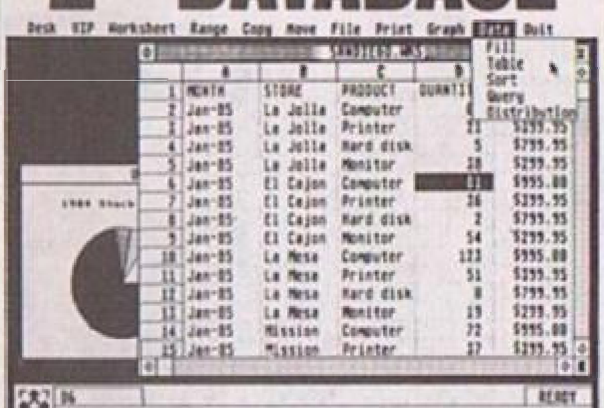
The current version of VIP Professional that is being shipped is identical to Lotus 1-2-3™ and does not therefore use icons, windows, or the GEM interface. When STs are available from Atari with GEM and TOS on ROM, VIP will release a version to make full use of the ROM and the GEM features. This version will be issued FREE OF CHARGE in March 1986 to all existing users of VIP Professional.

1 - SPREADSHEET



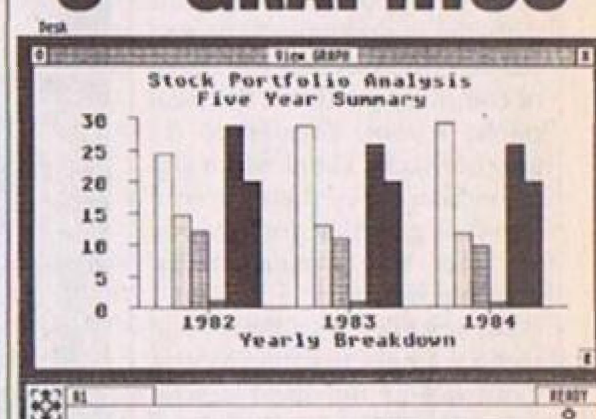
VIP Professional was modelled after the powerful, best selling Lotus 1-2-3™ program. It has every feature, every command of that program. In fact, the experienced 1-2-3™ user will feel right at home using the same keystrokes. But this version is made even easier to use by adding the user friendly face of GEM, so the beginner can use it right away too. If you want to do your home budgets, financial planning, or sophisticated business inventory control or budget modelling, VIP Professional will fill every need. And you can freely use 1-2-3™ or VIP Professional files created on other computers in VIP Professional on your Atari ST. And VIP Professional is not only flexible, it's powerful too, with a full 8,192 row by 256 column worksheet to use with up to four megabytes of memory. (Note: Lotus 1-2-3™ version 1 has only 2,048 rows).

2 - DATABASE



VIP Professional includes a powerful data manager to arrange, store and analyse your important information. It can be used to store records about your home or business and do extensive searches, sorts and comparisons. It allows up to 8192 records, with up to 256 fields and queries can be made with up to 32 search criteria. The database manager can be used in conjunction with the spreadsheet commands to add greater power to the database facilities including sorting specific ranges of the database. You can also specify how you sort files, from the highest value to the lowest value (or from the lowest to the highest), or alphabetically (forwards or backwards). The graphics part of VIP Professional can be used to show trends in the database or other information. With its powerful statistical functions, it has almost limitless power.

3 - GRAPHICS



VIP gives shape to your figures by letting you graph your data into six different types of graphs, in startling colour or black and white. Pie charts, bar graphs, stacked bar graphs, line graphs, scatter graphs and X/Y graphs. You can graph your spreadsheet or database data to give instant professional presentations. Your graphs will change instantly as you change the data. When creating a graph you may specify a main heading, a sub heading and a third title at the base of the graph. The necessary scales can be defined either by the user or automatically created. In pie graphs, the most important section of the pie can be separated from the other sections to draw attention to its inportance. You may save graphs individually on disk for use at a later date. You can also print your graph on any Epson compatible dot matrix printer.

FROM SILICA SHOP - THE UK's No1 ATARI SPECIALISTS

AVAILABILITY

VIP Professional is available from all Atari ST distributors and their dealers throughout the country. If your local dealer does not have VIP in stock, it can be obtained by mail order (with post and packing free) from:

SILICA SHOP LTD, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX Tel: 01-309 1111

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Please send me further details of VIP Professional for the ST

Mr/Mrs/Ms: .... *Initials:* .... *Surname:* ....

Address: ....

Postcode: ....

I am interested in the Atari ST ☐

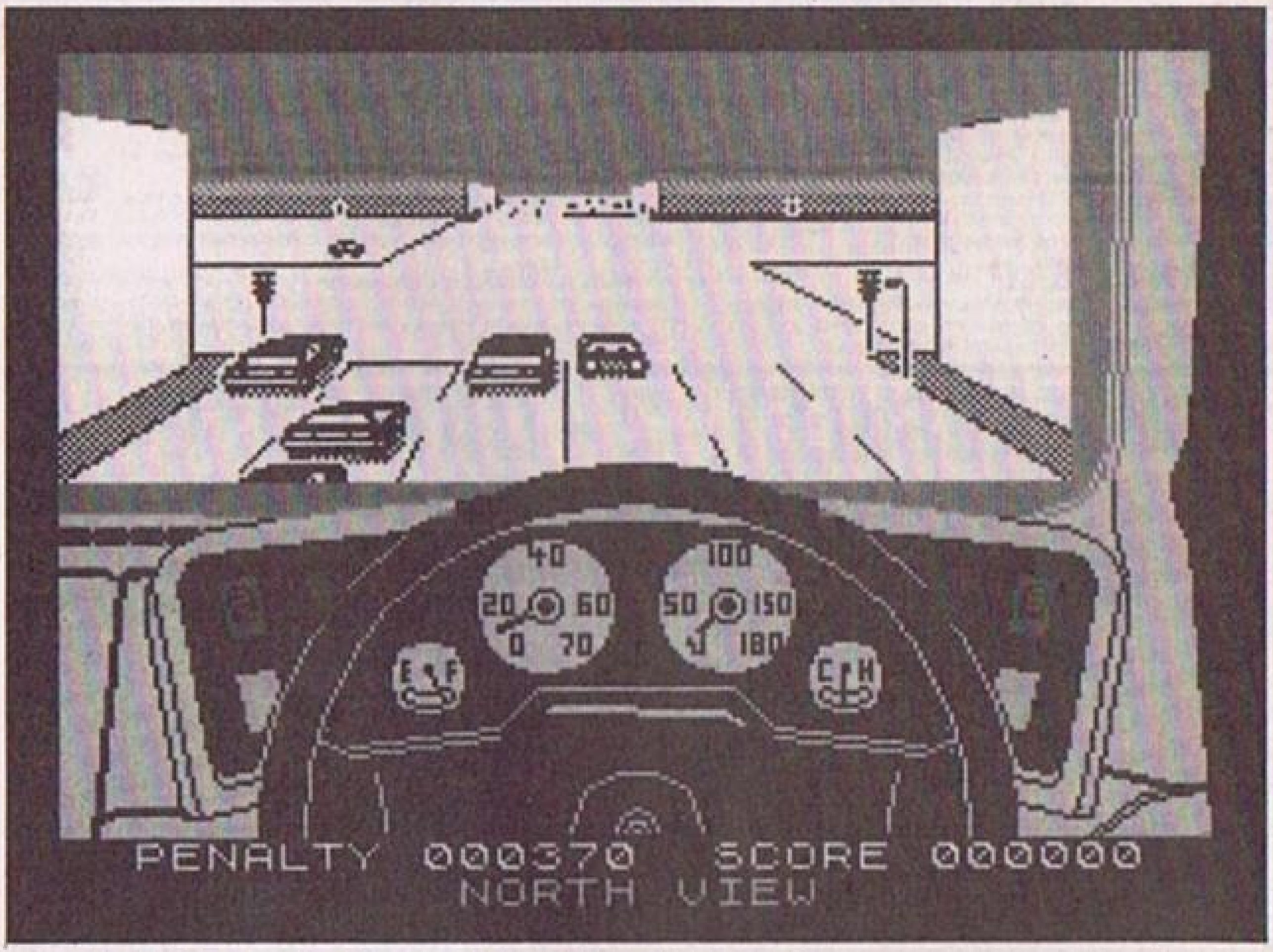
I already own an Atari ST ☐

A new dimension in graphics

You may not know it but you have almost certainly seen many examples of the work produced by Dimension Graphics, a four-man company operating from a sleepy Buckinghamshire village. Their detailed full-colour screen dumps have graced the pages of most popular computer magazines and the cassette covers of most well-known software houses.

The service Dimension Graphics provides is the result of a great deal of ingenuity, patience and the team's particular brand of technical expertise. "It all started about three years ago when I was toying with the idea of setting-up a software house," explains Paul Wyndham, one of the co-directors. Disappointed with their software contributions, he and partner Michael Manisty, head of computer studies at the local public school, decided to try another tack. There was a gap to be filled, they thought, by a low-cost graphics work station to cater for computer-aided design projects.

Meanwhile, Wyndham had met a young man called Martin Cornwall at the local newsagents where Cornwall was busy setting-up a computerised newsround. A computer buff since he first laid childish fingers on a programmable calculator, Cornwall was engaged to write software which would enable a BBC to control a 10-pen plotter for the graphics workstation.



It's a plot

It was plotting some particularly pretty patterns just for fun which gave Wyndham the idea of providing a purely pictorial service. Since the plotter had taken four hours over the job, he also knew he would have to find a new system to do it. A trial loan of a Tektronix 4691 colour graphics copier, which had only just appeared on the market, convinced him that it was the answer. Capable of producing fast, high-resolution copies of any computer screen, the machine was a snip at a mere £18,000.

It needed Cornwalls technical wizardry, however, to adapt the 4691 to work with a wide range of micros. The system he devised goes roughly like this. A Spectrum, say, is married to a BBC, by means of adding extra circuit boards inside the Spectrum and re-writing its operating system. In the case of the Commodore, the BBC also has to be fitted with extra RAM top take 64K. Next, expert games player Nick Csom loads a tape on to the Spectrum and at any point can press a specially-designated button to select a frame and send it to the BBC, without having to freeze the game. The frame is then saved on the BBC disc drive.

After that, it is simple to take a few steps across the room and insert the disc into the drive of the host BBC, which is connected to the colour copier by a Centronics interface. A menu offers a choice of machines, print sizes and colour intensities and, within a few seconds, a copy produced by four-colour ink-jet heads appears with a resoluation of up to three million dots for the largest A3 size print.

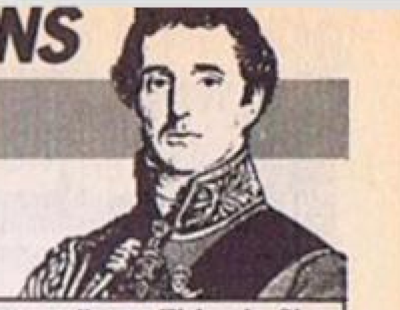
"Apart from the monitors, nothing is as it was when it first arrived," says Cornwall proudly, pointing to the jumble of metal spaghetti hanging from the back of each micro. So far, a Spectrum, Commodore 64, BBC and Electron have all been adapted and an Amstrad 464 and 664 are ready to go. An Amstrad 6128 is next on the list and there is also a BBc with a modem to take frames from Prestel for IP wanting colour hard copies of their colour hard copies of their contributions to viewdata.

"Apart from the cost of each micro and the BBC to go with it, there is an investment of three to six months of Cornwall's time to set up each new system," explains Wyndham "so it is important to get our sums right." So far the firm have managed to convince most of the computer magazines, and software houses including Activision, Ocean, virgin, melbourne House and many others, of the advantages of colour screen dumps compared to everyday colour print or transparency.

"Unless you have a very experienced in-house photographer, our system is more reliable," says Wyndham. "There is no blur and no curvature with a screen dump and you can always get the colour intensity you want."

Having praised his product, Wyndham adds that a few good

DIMENSION GRAPHICS



words are in order for the much-maligned BBC. "No other micro could have done the job," he says. "Despite its memory limitations, it is an excellent machine – fast, versatile, and very good value, certainly for serious applications if not for the games player."

A new and more ambitious project than ever before is now occupying the team's thoughts. They want to extend the system to cover the IBM and its compatibles. "There are several people producing IBM sales charts, graphs and the like on colour slides using very expensive equipment. You also need projectors to see them, so a service like ours could prove very popular," says Wyndham. Pointing-out that 70 percent of the business market uses IBM or compatibles, he adds: "It is a very promising area."

Spaghetti junction

A new approach has been devised for this project; instead of modifying an IBM, they will use an RGB digitiser – "another of Cornwall's spaghetti concoctions" – controlled once again by a BBC. Its advantage over commercial digitisers is that to be able to handle moving graphics, it digitises a whole frame at the same speed as a television frame instead of the usual five or six seconds.

The system, is already in working order but there is still a problem to be solved, "which probably explains why no-one else had done it yet." Because of the many hardware and software variations involved, a huge amount of documentation might have to be ploughed through to capture whatever particular frame the customer requires.

"It is not the same as loading a quick game on the Spectrum", says Wyndham. To circumvent the problem, Wyndham and Cornwall are thinking of developing a plug-in card to send to clients so that they can get their own frames on to specially-formatted discs. "We haven't quite cracked it yet, but when we do it could be the goose which laid the golden egg," says Wyndham.

Jungle or database

Pool the resources of large numbers of micro owners and you can open a whole wealth of alternatives to the simple pleasures of playing games, as the dynamic Compunet service has been showing recently.

Set up slightly more than two years ago, Compunet is proving to be an active rival in the field of electronic publishing to the British Telecom Prestel, although so far it is available only to owners of a Commodore 64 or 128 computer and a Commodore modem. The two together enable them to log-on to a network which offers business information, games, software they can download directly on to their machines, credit card shopping, or perhaps a spot of idle chit-chat with other insomniacs in the small hours of the morning. "Compunet is both a serious and an entertainment medium," says editor Jane Firbank.

A subsidiary of Reactive Technology, Compunet was set up by Alan Carmichael and Graham Craigie. Both were then working for ADP, which specialised in on-line systems, and they were responsible for developing the prototype for Commodore of an educational down-loading system called Petnet. As Commodore lost its stake in the educational market, Petnet was eventually abandoned but the ground had been prepared for Compunet.

"We did not set ourselves up as a rival to Prestel," says Carmichael. "The main idea was to find a low-cost way of distributing software and support to Commodore users." Firbank adds that it would be difficult for a private commercial company to compete with Prestel, whose bills are subsidised by British Telecom. Nevertheless, Compunet enjoys an advantage, in that like the French system Teletel, it was designed for a user base of micro owners. Prestel was first conceived before anyone had even heard of home computers and therefore acts mainly as a retrieval system; a numeric keypad is the only means of communication, except for information providers who have to have their own special editing terminals.

Compunet, on the other hand, is two-way, with subscribers able to retrieve or download whatever interests them and also to contribute whatever they please. "Compunet is a jungle," says Firbank. "The users do everything – we just provide the headings and tidy things up."

Thus there are several magazines on the system run by user. There is a hall of fame in which selected graphics and sound displays can be admired and a chat-line consisting of separate "rooms" containing up to eight chatters at a time. A

COMPUNET

busines user can upload a file created, say, by Wordstar to be downloaded directly by someone else using Wordstar. Software houses such as Level 9 distribute their programs as down-loadable software on a royalty basis and a link with Compucard offers goods for sale via credit card.

Famous programmers such as jeff Minter advertise their wares by displaying tantalising snippets of their latest games. Some pages late an access fee; a number of contributors charge up to £5, or sometimes more, for their programs and routines. It is even possible to donate a charity by looking at a particular page for which a fee is levied automatically. Of course, users can play **Mud,** beloved by Compunet subscribers long before the game was launched on the great wide world of micro owners by British Telecom.

"You are never alone with Compunet," says Firbank. She cites the case of an invisible admirer who once pursued her from one room to another of the chat-line with a proposal of marriage, even though she insisted she did not like ironing. More seriously, the chat-line recently enabled a professional programmer to help a youngster detremental what was wrong with his disc drive. Several software products have found distributors on Compunet and two people who first made contact on the system are now in the process of setting up a software house. Budding young programmers have also been known to find work on the strength of samples they have displayed on the system.

C connection time

Buying a Commodore modem is all that is needed to join the network. The standard price of £52.45 includes a three-months basic subscription offering a total of six hours' free connect time. "It is the deal designed to put the minds of terrified parents at rest by limiting the telephone bills their offspring can incur", explains Firbank. There is also a more expensive standard subscription, and a gold one offering increasing amounts of connect time on the system and other privileges.

Carmichael claims that compunet need not be expensive, provided users behave sensibly and plan their access times carefully. Telephone charges are added to Compunet fees, so off-peak times are best, hence the nocturnal habits of many Mud addicts. It also helps to keep down charges if you happen to live near one of the system's 12 nodes, in which case you are charged at the local call rate, a minimum of about 43 pence per hour.

Its various benefits have attracted around 7,000 subscribers to Compunet so far, compared to only 2,000 in July last year. About half of them are business users and many are dedicated Mud players. Carmichael expects to reach around 10,000 Commodore subscribers and then hopes to extend the system to BBC and Amstrad owners.

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Readers should note that because of the disruption caused by the recent move from Kings Cross to Victoria, a backlog of readers' letters has built up. We are answering letters as soon as possible but a reply may take up to four weeks to reach you.

Help wanted

Dear Sir, I wonder if any of your readers can assist me with the compilation of a book I have been commissioned to write.

The book – to be entitled *The A-Z Of Computer Crime* – will chronicle, in a non-technical way, the history and development of computer aided crime and embezzlement.

For reasons we are all aware banks, large corporations and security firms are reluctant to discuss any aspect of such crimes.

I am, however, anxious to include as much new material in the book as possible.

I would like to hear from any reader who feels he can assist with this project. Beit with a personal experience, background knowledge, or even a newspaper or magazine clipping he or she feels might be of interest.

I would stress that all requests for anonimity would be strictly observed and all assistance duly recognised.
Cliff Walden-Goodwin,
9 Humber Street, Chopwell,
Tyne & Wear NE17 7DQ.

Which computer?

Dear Sir, I am writing to you for a bit of advice, my husband and I are completely new to the world of computers.

We would like to know your opinion as to which machine would be of most use to use. We have a small business and we would like to do our ledgers on it but we would also like to play games although this is not absolutely critical.

We have been reading about the Amstrad PC8256 and also the new Commodore 128D, it seems that you cannot play games on the Amstrad but this seems to be the one that most shops are pushing.

We look forward to your opinion and also any other suggestions you might have.
K.E. Bates,
Solihull.

Editor's reply – Buy the Amstrad computer and, if you can afford it, buy the PCW8512 as this machine offers the best value for money.

You can play games on the PCW computers though there are few available at present. This situation is likely to change though.

Bring on the girls

Dear Sir, I am writing on behalf of the girls in 4F at Fulfen School (middle). At the moment we are having C.A lessons which is all about computers.

One thing that we noticed was that all the boys who talked about a computer always had boys games, war games, car games and games like that. Our point is why don't computer programmers ever make games for us girls. I mean computers aren't made for boys only are they? Even games like Daly's Decathlon could have a well known ladies game instead.

I hope you see our point. I know this is cheeky but could you please write back and give me your view on this.
Julie Wedge,
Walsall.

Editor's reply – For whatever reason, computing seems to have become a male dominated activity. In excess of 90% of the computers in this country are used by males and it is for this reason that commercial companies gear their output to the sort of games that will appeal to boys.

Perhaps though a bit of female lib would not go amiss, all it would take is a few more people like yourself to make it known that there was a market for female type games.

Copyright complications

Dear Sir, I have been reading *Your Computer* for several years now, and am turning to you for advice, on a matter of copyright permission.

Almost six months ago, I completed the coding of an Adventure game for the Sinclair Spectrum, based on the book *Lord Foul' Bane* by the American author, Stephen R. Donaldson. The game is in Z80A code and is the result of almost 2 years work. Several Software Houses expressed interest in the game, pending copyright permission, therein lying the problem.

I wrote to the U.K. publisher, Del Rey/Ballantine of New York, last November. Four months and three letters later, I am still waiting for some sort of a reply.

Even a flat "No" would be b etter than waiting. I can't believe that publishers simply do not reply to reasonable requests (such as game marketing permission).

What I would like to know, if you could help, is: What further action could I take to get a reply from the US publishers?

Failing this, how much would I have to change the story/characters etc. in order not to require copyright permission? (I don't want to do this, as it will detract from the meaning of the Game, and the selling potential but I am curious as to the precedent of such games as Robin of Sherlock, Bored of the Rings, etc. and whether they required publishing/copyright permission.) Any help or advice you can offer will be most welcome, as the situation is quite frustrating.

Many thanks, and keep up the good work.

Yours faithfully,
Derek G. Ireson,
Newbury.
PS Del Rey/Ballantine Books is a Division of the huge "Random House" Publisher, I am informed by Collins of London.

Editor's reply – This, as they say, is a tricky one. As to what action you could take to get as reply from the US publishers, perhaps a 'phone call to them would help though, despite BT's publicity, it could prove expensive.

As to your second question we can only suggest that you seek professional legal advice if you feel you might be in danger of falling foul of the copyright law.

IN TOUCH

How to write for Your Computer

We called this magazine *Your Computer* precisely because we welcome you views, tips and hints and even your criticisms of machines and software in general.

Here's how you go about getting you name into print. Your article should be typed, double-spaced, on A4 paper. A name and address on each sheet would help. Don't forget to tell us which machine it's for on the envelope. Don't forget full instructions to us how to load and list your program and how to enter it for the readers.

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Spectrum

TAPE: SP01

SPACE FRIGHT

Machine: Spectrum 48K
Program Type: Arcade
Author: Stewart Green

A blip appears on your radar on the outer reaches of space. It is you against the bad guys, or is it all your imagination? One thing is certain, it is kill or be killed in this very fast galaxian-type arcade game.

Using mainly machine code, the program features horrific attack patterns by saucers – and cups – rubic cubes, skulls, and more. Not only do you have to destroy them, while avoiding both the nasties and their bombs, but also keep an eye on that energy. That will fail drastically if you use your shields and fire quickly but can be replenished by intercepting the descending energy pods. Plenty of fast-action levels to keep the shoot 'em-up addicts amused.

BACKGAMMON

Machine: Spectrum 48K
Program Type: Board Game
Author: Colin Speed

This classic board game requires both skill and luck with the dice to win. The Spectrum program consists mainly of Basic but with machine code graphics and move routines. That has led to a very colourful version of *Backgammon* with a speedy computer response time, even on the highest of the five skill levels.

The program also features an unusual move input method, making the game extremely easly to play with on a few keys. Arrows on the screen will show all your possible moves, rather than having to enter co-ordinates as in many other versions of the game.

TAPE: SP02

CASTLE DRACULAR

Machine: Spectrum 48K
Program Type: Adventure
Author: Graeme Poole

Deep within the labyrinthine castle lies the evil Count Dracula, Lord of Darkness. Your mission, should you choose to accept it, is to enter his realm, find the castle, and destroy him.

This weighty Basic adventure recognises six directions, 11 other Basic commands, plus a save/load game feature. There are plenty of objects to find and they all have a use – but what is it? The program is well-written and documented, so it could easily form a basis for your own adventure plots.

JUM*BERT

Machine: Spectrum 48K
Program Type: Arcade
Author: Norbert Roescher

Jum*Bert is a fast 100; percent machine code version of the classic *Q*Bert* arcade game. The program features a smart title screen with two-channel sound, re-definable keyboard or joystick, plus animated graphics and game music.

The object is to colfour the pyramid green, whilst avoiding Harry, Harry, the black ball and the dark grey ball, and jumping on Herman – who keeps changing the colours back to yellow – and the grey ball, which will get rid of all the nasties. On later screens, you have to jump on the blocks more than once to change them to green – and don't jump off the pyramid.

BBC

TAPE: BBC01

SHOOTOUT

Machine: BBC B
Program Type: Arcade
Author: J. R. Wilson

Having tracked the Wilson gang for many days, you have finally run them to the ground in an old ghost town. The gang is large, being well into the hundreds, and your only chance is to out-gun them. Dashing along the main street, shadows are glimpsed in windows, in doorways, atop buildings. Bullets ricochet as you dodge and weave down the street, blasting away with your own hundred-and-six shooter – it's a good thing you brought plenty of ammunition.

A very fast and colourful 100 percent machine code game, with sound, night and day graphics, and redefinable keys or joystick.

YELLOWSTONE PARK

Machine: BBC B
Program Type: Arcade
Author: J. R. Wilson

Yellowstone Park is a pleasant enough place but you would rather be somewhere else – anywhere else. As Dozy Bear, you have to escape from the park. Unfortunately, there are a few urgent jobs which you have to finish first.

Dashing about the screen, avoiding the wardens, the hunter and the evil tourist cars – they never watch where they are going – you have to build a wall, picking up iced buns which the tourists leave behind occasionally. If you complete this, there is also that dream house you have to build for 'her indoors'. Finally, you build a sports car in which to escape.

»Software Exchange«

CBM 64

TAPE: CBM01

THE BIRDS

Machine: CBM-64
Program Type: Arcade
Author: Richard & John Palmer

In this unusual game, you are the mother of three hungry chicks. Flying from the nest, you must dive and collect 20 worms, returning each to the nest all inside six minutes.

As we all know, it is the early bird which gets the worm and there are plenty of other greedy birds all trying to stop you. If motherhood prevails on the first screen, there are seven more levels to test your true paternal insticts.

STELLARWAYS

Machine: CBM-64
Program Type: Multi-player strategy game
Author: J. Dakin

For two to seven players, this high-quality strategy game has you bidding for the rights to build inter-stallar travel stations.

Trying to keep ahead of the competition, you will be attempting to expand your company stations to adjoining star sectors while keeping a share majority and avoiding such natural disasters as black holes and the Arcturian Mega-goat, both of which tend to give share prices that sinking feeling. Perhaps you will be lucky and be awarded a hyper-route by the Galactic council but it is your mettle which really counts in the giddy world of galactic finance.

TAPE: CBM02

ADVENTURE PENCIL

Machine: CBM-64
Program Type: Adventure Pencil
Author: Chris Pile

Have you ever had one of those wonderful ideas for an adventure problem? Have you ever wanted to create your own world, where only your law applies? Feeling God-like? Well, this is as far as most people get because of the sheer effort involved in writing an adventure program.

Adventure Pencil aims to change all that. The menu-driven Basic program will prompt you for all the information necessary. All you need t do is draw a map and enter the descriptions for each location when prompted. The program allows for up to 80 character location descriptions, mosters, weapons, and the four basic directions N, E, S, W – and will put the whole program together for you.

BASS (Basic ASSistance)

Machine: CBM-64
Program Type: Disc Utility
Author: L. Jack

This 100 percent machine code disc utility will allow you to perform all those mundane disc commands at the touch of a button. The program caters for disc directory, scratch file(s), rename file(s), validate disc and digital clock.

Once running, a simple SYS call will give access to the system, which is run by Mac-like menus.

Amstrad

TAPE: AMS01

SAUCER ATTACK

Machine: Amstrad CPC-464
Program Type: Arcade
Author: John Kennedy

Beware of low-flying saucers in this machine code favourite. It seems that those Space Invader saucers are well and truly fed up with acting as cannon fodder for the alien duck shoot. They have now taken to dive-bombing the city, and – yes, you guessed it – you are going to save the day.

After a humorous introduction, this machine code game gives you three lives to shoot the saucers and their bombs out of the sky. Watch them fall.

OVERDRIVE

Machine: Amstrad CPC-464
Program Type: Arcade
Author: Tony Loton

Race at breathtaking speed around a three-dimensional Grand Prix circuit. Chasing the fastest lap time, you must avoid the nerve-shattering explosion of hitting the kerb or the other drivers. Watch those tight bends as you fly through the racing corners. This fast-action machine code racing simulation puts you in the driving seat.

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St. Edwards School, Oxford

In our continuing look at the role of micros in education, we move this month to the work done by a typical public school with computers being used by O and A level students. We will study the reactions of masters, students and the school administration to the introduction of these electronic teaching aids.

St Edwards School, Oxford is home for 569 students of both sexes studying for O and A level examinations. The school has an excellent computer department, developed and managed by the physics master, Tony Snell.

It is also one of the pioneering schools in the tuition of computer-related subjects. Computer studies were first instituted at St Edwards in 1968, when the head mathematics teacher, David Tinsley, introduced an IBM 1500, one of the first computers which could use an ordinary television set as well as a monitor. While Tinsley became one of the leaders in the development of computers in schools throughout the country, St Edwards had to wait 12 years before investing seriously in computers.

Not a game in sight

When the school returned to a serious involvement with micros, the resurgence started with the purchase of three Research Machines 380-Z computers by the mathematics and science departments. Even those machines were not available for use by the general student population – use was restricted to a few listed further mathematics students who swore devoutly never to play games. That restriction led to a general belief among students that only those taking at least four A levels, preferably including further mathematics, physics and chemistry, had the intelligence – and the strange mentality – to operate a computer, which at the time was largely true.

Two years later the school bought two BBC micros which attracted the interest of other students – if only to play games – and proved to many that computers were really easy to use. Unfortunately, because of a distinct lack of companies trying to sell computers to schools, and even less financial incentive to buy them, it was only through the persuasive efforts of one of the masters that the school decided to invest in a computer department and so include computers in the educational curriculum.

Plans were put forward by Snell for a network of 12 BBC micro terminals on an Econet system and, after careful consideration by the governors, who had to be convinced about the importance of computers in the school, the go-ahead was given.

The system was bought from a hi-fi dealer in Oxford and installed by the school in a dedicated classroom. The E-Net system, manufactured by Amcom, has a file-server incorporating a 10MB hard disc and an extra BBC acting as a printer server. Each terminal uses a Cub monitor and has its own 40-track Pace disc drive.

Completed in May, 1984, entry to the centre was initially restricted to registered users only and little use was made of the centre during working hours. Now, two years later, most of the students have experience with the computers, although the girls – who are restricted to the sixth forms – tend to shy away from them. "They don't want to be shown up," suggested Snell, "or else it is too much like an office".

Teaching teacher

Needless to say, he was not particularly worried about their lack of interest but he has tried to get the teaching staff involved as much as possible. The scope for computers in education is limited to a degree, so only those teachers with an interest in computers and the ability to use them will take the trouble to incorporate them into their teaching. For students and teachers alike, "there is a built-in fear with some that to be competent with computers they need to be able to program and that it is very technical. Yet some of the least technically-minded staff have become the best users."

Varied applications

The subjects to which computers can now be applied vary from musical theory to astronomy and foreign languages. First-year students use the centre at least once a week as part of their English, mathematics and physics lessons. Each computer contains the Viglen cartridge ROM which is used to run View, Wordwise or Wordwise Plus, one of the best methods of teaching punctuation, and a whole suite of mathematical programs has been written and marketed by . Two AMX mice are also installed, with the idea of the students writing, editing and producing their own internal newsletter using *Fleet Street Editor*.

Inevitable whizz-kids

How much use is made of the centre depends entirely on the masters. A fanatical teacher will find an excuse to use computers for teaching almost any aspect of his subject, while the unenlightened need never touch a keyboard. A series of courses has been offered to members of staff to familiarise them with computers but as yet only 10 of the 50 staff have been prepared to give up a few of their evenings.

Among the students there is an inevitable fraternity of computer wizards who can be found typing through assemblies, lunch, games and long into the night, while others refuse to accept the increasing importance of computers and try desperately to ignore them.

Gaining acceptance

Perhaps the most exciting development, simple though it may seem, is the use of the department for word processing. Students are beginning slowly to latch on to the idea that within a few weeks of using the BBC, aided by a touch-typing tutor, you can develop a reasonably fast typing speed. Using a WP instead of writing freehand makes for much better essays, both in style and presentation – "the art of writing is re-writing," said James Thurber. At least students can save a furtune in Tipp-Ex, not to mention the time saved re-writing essays which did not meet with approval.

In other parts of the school, computers are still trying to gain acceptance. The register of pupils and a catalogue of interesting magazine articles from the last year or so constitute the only large databases created. Ironically, while the computer department dabbles with expensive satellite receivers, the school administration is still confined to a pocket calculator and several thousand pieces of paper.

The acceptance of computers at St Edwards appears to be increasing rapidly, perhaps more so with the students than with their seniors, but it is the intensely embarrassing feeling a teacher has when his class demonstrates how the computer can do it better than him which could be the incentive for teachers to catch up on their knowledge.

London Computer & Electronic School

Welcome back to the place where we try to turn joystick jottings into job placements to help you get that job. *Your Computer* continues its monthly Careers feature.

After having looked at one particular institution's courses in computing this month, we broaden our scope and look at another training scheme and on trends in the computer job market.

Job hunters in the south-east might consider the London Computer and Electronic School, 01-741 9345. Administrator Terry Hughes says that the training program at the school is run in conjunction with the Job Training Scheme.

"We train both computer programmers and operators," he says, "but you must be over 19 and have been out of full-time education for more than two years to qualify under the training scheme."

Hughes also warns that you will have to pass both a three-and-a-half-hour aptitude test and an interview before being admitted. Have been enrolled, however, the school undertakes to get everyone a job if they complete the course.

The school is funded by the Manpower Services Commission but Hughes says it relies on more than 80 'regular' firms in private industry offering employment. The training is in the form of full-time 9 am to 5 pm, five-day-a-week course. It runs six months for programmers and four-and-a-half months for operators. Students train on IBM mainframes and dedicated systems and receive a £40 per week allowance from the MSC.

"We are trying to break the vicious circle in which companies require experience before they will give you a job; but you can't get experience without having had a job," says Hughes. "We are trying to make people feel like full members of staff from the first day."

According to a recent report in *The Sunday Times*, some background in the workings of the City would also not be amiss. The country's financial experts are busily gearing-up for the Big Bang on October 27 when de-regulation of the Stock Exchange will mean that stocks and shares can be bought and sold using a computer over telephone lines.

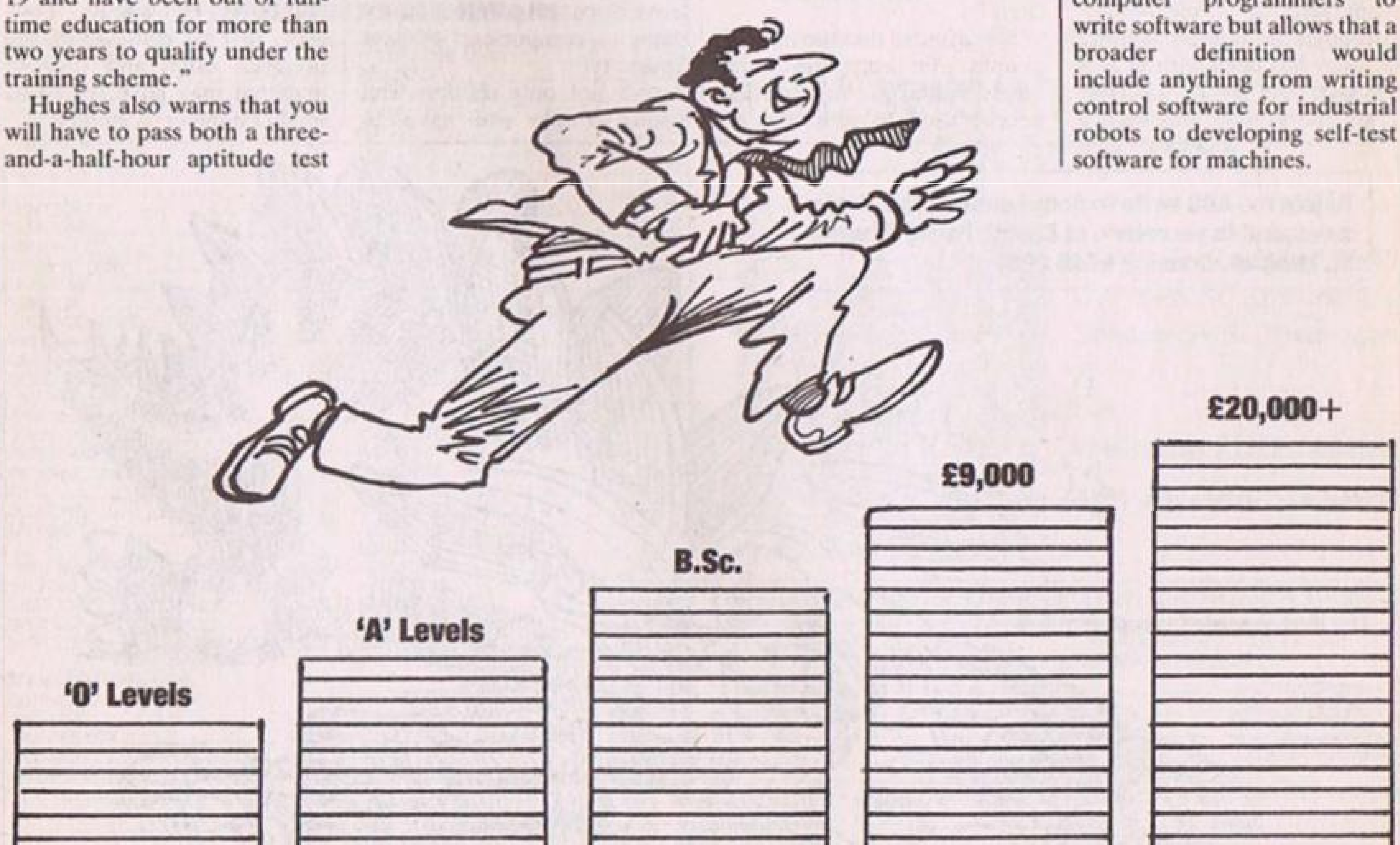
John Westfall's recent report suggests that large numbers of computer programmers with financial expertise will be hired in the coming months, with a salary to match the new demand.

"Although he has yet to catch up with the much-publicised six-figure salaries paid to top stock dealers, the computer expert is not far behind," says Westfall in his report. "A corresponding explosion in salaries has accompanied the system designers' new importance in the City, with junior systems analysts earning at least £25,000."

If those figures sound tempting, listen to the types of employment

The Observer recently highlighted the demand for such people in a report headlined Sky's the limit for software engineers. While not commanding the figures talked about by Westfall, Peter Freedman estimated that good computer science graduates should be able to garner at least a £9,000 starting salary and up to £20,000 with only five years' experience.

Freedman says the purists' definition of a software engineer is someone who works for a systems house or software company writing the development tools which allow computer programmers to write software but allows that a broader definition would include anything from writing control software for industrial robots to developing self-test software for machines.





East London Computer Club

When most computer clubs started, they were a loose collection of like-minded individuals with a burning desire to twist as much as possible out of the infuriating black boxes they called home micros.

Organisation, however, crept in relatively quickly and computer clubs soon found themselves part of national and regional organisations. The national organisation, or at least of the most prominent, was the Association of Computer Clubs. The ACC has provided the regional clubs lists you see opposite.

The ACC, however, was really too broad a group to handle an area as specific as London and so the Association of London Computer Clubs came into being. To get an idea of where computer clubs are leading, we spoke to Frank Spilsbury, a member of the East London Computer Club and a representative to the ALCC.

Spilsbury took an interest in computers, and subsequently computer clubs, because of a fascination with automatic manufacturing technology. Although the home computer industry has been with us in a big way only for the last five years, he says he has seen a number of changes, particularly in the way computer clubs are specialising. "Clubs are now confining themselves to one machine or another, so they can really get into that machine and work with it," he says.

Rivalry reduced

Spilsbury suggests that by concentrating on one particular machine, rivalry between machine owners is reduced. "Members had suffered from the enormous number of enthusiasts promoting their particular interests," he says, "and many parents are discouraged by computers which are used only for games, which encourages piracy and can be very disparaging for the children."

He says also that the reasons people join computer clubs have changed. He suggests that people used to join because they needed help with using their machines but that such help is now available through books and magazines. That means that clubs are now filled with machine-specific enthusiasts more than anything else.

Club members spend time not only writing their own software but also trying to plug the holes in some commercial offerings. "A great deal of time is spent programming and some of that time is spent re-programming professional programs," he says.

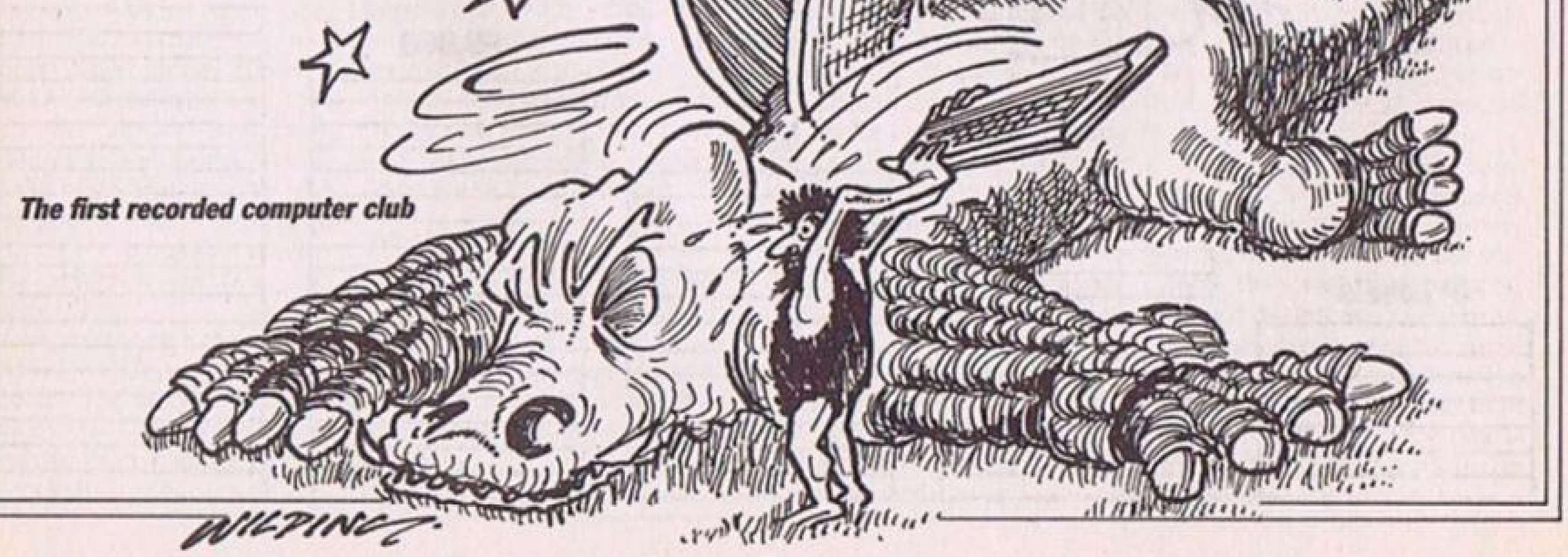
He adds that that kind of programming experience often stands members in good stead in the job market. "Youngsters who take an interest in advanced programming tend to leave clubs and go into industry doing computing," says Spilsbury.

It is not only children and young people who take an interest in the computer clubs. According to Spilsbury, there are plenty of senior citizen enthusiasts. Whatever their ages, club members do not expect the group to run for nothing and ALCC clubs are run entirely on their own members' finance.

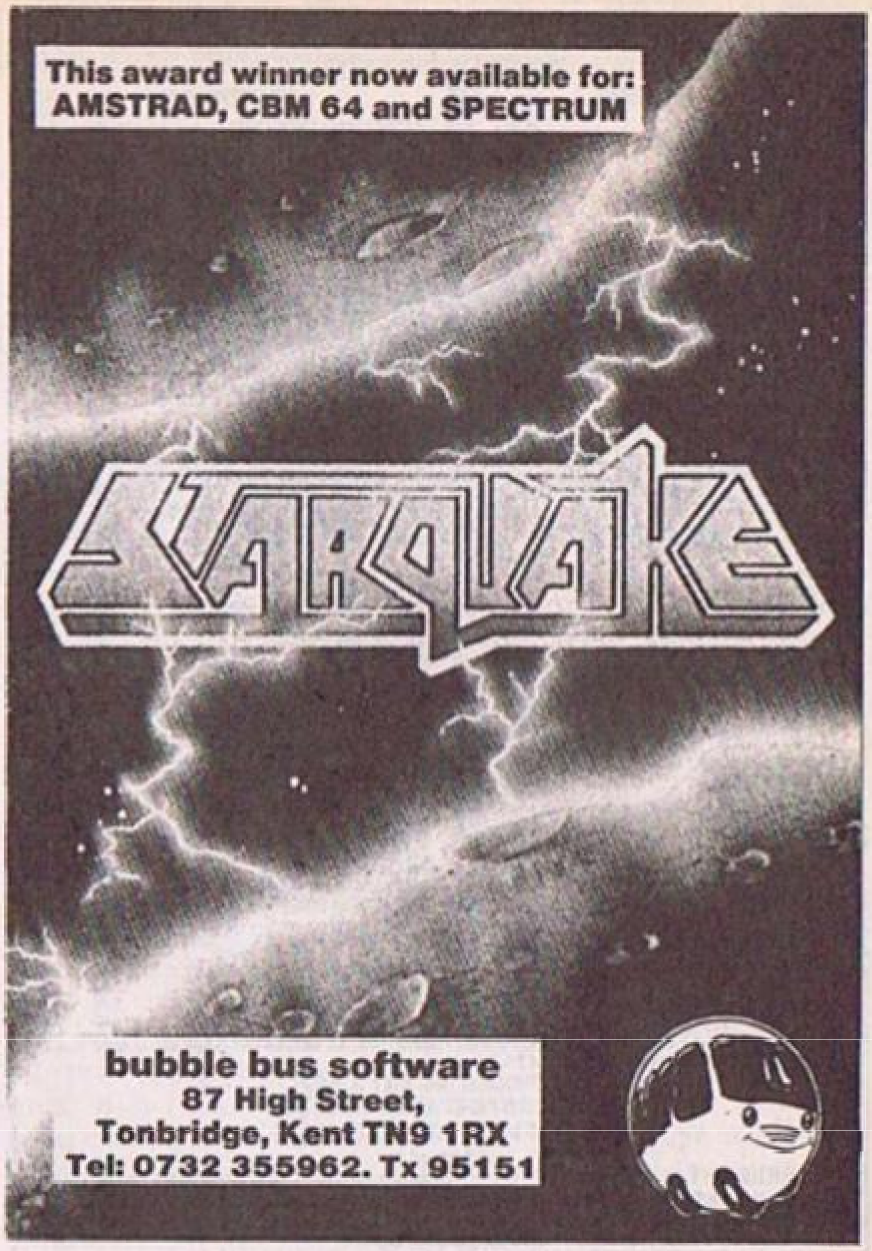
Spilsbury also suggests that the distribution of clubs throughout the London area has more to do with money than population. East-enders have only one club – after all, you don't see Angie and Dirty Den bashing away at a Spectrum, do you?

"It has a great deal to do with class; the middle class tend to use computers most and those in the East End tend to keep their heads down," says Spilsbury. He admits, however, that his club has moved premises often and suggests that that may have led to its smaller number of members.

To join the ACC write to Andy Leedder, the club's membership secretary, at Church Farm, Stratton St. Michael, Norwich NR15 2QB.



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KALEIDO

◆ Spectrum ● Nick Goodwin

This short program will generate attractive graphic patterns based on the basic shape of an eight-pointed star. The pattern is formed in a clockwise direction with a series of stars being drawn successively on the screen. A degree of randomness in the program ensures that no two patterns will ever be the same.

If the program is left running for some time, some interesting effects in the basic pattern can be noted.

```
10 'KALEIDO by Nick Godwin
20 RAD
30 MODE 0:BORDER 26:INK 0,26
40 x=300:y=200
50 INK 1,0
60 LOCATE 1,25:PRINT CHR$(23);CHR$(0);"0";
70 LOCATE 1,25
80 IF INKEY(15)>-1 THEN PRINT CHR$(23);CHR$(0
);"0";
90 IF INKEY(13)>-1 THEN PRINT CHR$(23);CHR$(1
);"1";
100 IF INKEY(14)>-1 THEN PRINT CHR$(23);CHR$(
2);"2";
110 IF INKEY(5)>-1 THEN PRINT CHR$(23);CHR$(3
);"3";
120 cosb=COS(PI/4):sinb=SIN(PI/4)
130 i=INT(RND*16)
140 r=INT(RND*200)
150 r1=INT(RND*r/2)
160 a=RND*PI/4
170 cosa=COS(a):sina=SIN(a)
180 MOVE x+r*cosa,y+r*sina
190 DRAW x+r1*cosb,y+r1*sinb,i
200 DRAW x+r*sina,y+r*cosa
210 DRAW x,y+r1
220 DRAW x-r*sina,y+r*cosa
230 DRAW x-r1*cosb,y+r1*sinb
240 DRAW x-r*cosa,y+r*sina
250 DRAW x-r1,y
260 DRAW x-r*cosa,y-r*sina
270 DRAW x-r1*cosb,y-r1*sinb
280 DRAW x-r*sina,y-r*cosa
290 DRAW x,y-r1
300 DRAW x+r*sina,y-r*cosa
310 DRAW x+r1*cosb,y-r1*sinb
320 DRAW x+r*cosa,y-r*sina
330 DRAW x+r1,y
340 DRAW x+r*cosa,y+r*sina,i
350 IF RND>0.2 THEN 70
360 i=INT(RND*15)+1:IF i=1 THEN 360
370 INK i,INT(RND*(27))
380 GOTO 70
```

TRANSFORMERS

◆ Amstrad ● Ferguson Main

Transformers, an Amstrad program, lays down the basic method for turning any shape or size wire-box diagram into any other shape or size wire-box diagram, providing that each shape does not contain more than 26 straight lines. In a computer program, or title page for a program, it might be appropriate to transform one shape into another. You might not have occasion to turn a caterpiller into a butterfly but you might want to change a house into a robot or reduce a logo – such as your initials – into one small spot in the centre of the screen.

Alternatively, you might prefer to break your logo into 26 pieces and cause them to take up different shapes and positions round the screen, or perhaps to fly off the screen altogether. What we have is simple animation, with the wire-frame picture changing shape for each frame of the sequence. All the user has to do is draw the starting and finishing frames of the picture, which admittedly is time-consuming if you do not have a light pen, and the computer will fill the in-between frames.

The program consists of three sections, two of which the user has to enter. Section 1 is in Basic. This part of the program holds the co-ordinates of all the lines in both the first and the final frame of the picture – i.e., the co-ordinates for the diagram with which you want to start and the co-ordinates for the diagram with which you want to finish.

The diagrams may be only one pixel in size; alternatively they may be 26 random lines all over the scene – there is no requirement for both start and finish diagrams to be conventional, although one at least of them should represent a recognisable object. The main task of this section is to generate the co-ordinate data for all the intermediate frames.

Section 2 is a series of machine code routines which will put the frames on the screen at a speed which lends the transformation a reasonably smooth degree of animation. There is no need to laod this section, since the Basic does that for you.

Section 3 is the numerical array of co-ordinate data. It starts at address &8440 and grows in size proportional to the number of frames in the animation sequence. Basic limits the number to 10, to ensure that the array does not over-write the important operating-system bytes which live in high memory.

Once the Basic program has been given diagram co-ordinates and run at least once, it can be removed from the computer memory. The co-ordinates for the start diagram, the finish diagram and the animation sequence are preserved, and the transformation can be run any number of times by CALLing the machine code routine.

The Transformer program has been written so that it can be used in ways which go beyond turning diagram A into diagram B. The Basic listing contains some demonstration co-ordinates which will transform a small square into a large square but it is best to consider the simple case of changing one line into another. Figure one shows a START DIAGRAM, consisting of LINE A, and the intended FINISH DIAGRAM, which is the same LINE A, only shorter. The co-ordinates of the start line are given by SX,SY,EX,EY, and the co-ordinates of the finish line are given by LSX,LSY,LEX and LEY. They are standard Amstrad graphic-screen co-ordinates – 0-639 on the X axis and 0-399 on the Y axis. The Basic program holds those values in eight variables.

Information passes into those variables from the DATA lines. There is one data line for each lettered line. The caterpillar has 26 such lines, from A to Z, and so the data table is at its maximum size.

Continued from page 73

If 10 frames are planned for the transformation, the value of SX must be incremented by a certain amount 10 times until the value LSX is reached. SY similarly must be incremented. It is those incremental steps on the alpha and beta trajectories which the program calculates and stores in the machine-code array. This method of storing step values instead of co-ordinate values enables experimentation which would otherwise not be possible. For example, having metamorphosed a butterfly from a caterpillar or, more boringly, a large square from a small square, the end-frame can become the starting frame of a new transformation. The stepping values will then expand the butterfly into another, probably unrecognisable, shape. If the same principle of "going on from the finish frame" is applied carefully to geometrical shapes like the square, the effects can be a sensible enlargement of the shape, or a meaningful distortion.

The Basic program is complicated by the need to cater for certain situations which do not arise in the figure one example but which will occur in most transformations. For example, many trajectories will involve decrements, not increments. There is also the case where the gap between LSX and SX is only a few pixels. Dividing that gap by 10 – the number of frames – to find the step value returns a fraction, with which the Amstrad graphic co-ordinates cannot cope. The program over-rides that situation and supplies some sensible values of its own.

The work of the Basic is achieved within the Q For-Next loop, lines 150 to 280. That sets various machine code arrays, which can be thought of as three invisible tables, TABLE1, 2 and 3. TABLE1 is set to the pattern SX,SY,EX,EY and TABLE2, to LSX,LSY,LEX,LEY. The value in TABLE1 becomes changed as the transformation takes place and should achieve values identical to LSX,LSY,LEX and LEY on completion of the the last frame.

Since the original contents of TABLE1 are lost, a copy of them can be created in TABLE3. There are four machine code routines: CALL &8003 copies TABLE1 to TABLE3. Call &8005 restores TABLE1 using the contents of TABLE3. Call &8007 interchanges the contents of TABLE1 with that of TABLE2. Calling &8008 performs the transformation.

Finally, POKE &8092,&ED:POKE &8093,&42 reverses the direction of transformation, and POKE &8092,9:POKE &8093,0 restores normality. POKE &806B,&18:POKE &806C,&12 causes each frame to leave a trail behind on the screen, and POKE &806B,&28:POKE &806C,12 restores normality. By using those CALLs sensibly, it is possible to obtain an endless variety of wierd and wonderful effects.

```
99 REM TRANSFORMERS!
100 MEMORY &7FFF:GOSUB 1000:REM Set memory & load code
110 RESTORE 500:INC=10:INCH=INT(INC/2):POKE &8013,INC+1
120 INK 0,1:INK 1,24:DIM T(INC):R=&8100:P=&82A0:RR=&8440:F=0
130 FOR A=&8370 TO &843F:POKE A,0:NEXT
140 READ L:POKE &8000,L:POKE &8002,(260-(L*5))
150 FOR Q=1 TO L:READ SX,SY,EX,EY,LSX,LSY,LEX,LEY
160 POKE R,SX-((INT(SX/256))*256):R=R+1:POKE R,INT(SX/256):R=R+1
170 POKE R,SY-((INT(SY/256))*256):R=R+1:POKE R,INT(SY/256):R=R+1
180 POKE R,EX-((INT(EX/256))*256):R=R+1:POKE R,INT(EX/256):R=R+1
190 POKE R,EY-((INT(EY/256))*256):R=R+1:POKE R,INT(EY/256):R=R+1
200 POKE P,LSX-((INT(LSX/256))*256):P=P+1:POKE P,INT(LSX/256):P=P+1
210 POKE P,LSY-((INT(LSY/256))*256):P=P+1:POKE P,INT(LSY/256):P=P+1
220 POKE P,LEX-((INT(LEX/256))*256):P=P+1:POKE P,INT(LEX/256):P=P+1
230 POKE P,LEY-((INT(LEY/256))*256):P=P+1:POKE P,INT(LEY/256):P=P+1
240 A=SX:B=LSX:RAM=RR+F:GOSUB 310:REM X INCREMENT ON THE ALPHA LINE
250 A=SY:B=LSY:RAM=RR+2+F:GOSUB 310:REM Y INCREMENT ON THE ALPHA LINE
260 A=EX:B=LEX:RAM=RR+4+F:GOSUB 310:REM X INCREMENT ON THE BETA LINE
270 A=EY:B=LEY:RAM=RR+6+F:GOSUB 310:REM Y INCREMENT ON THE BETA LINE
280 F=F+8:NEXT Q
290 CALL &8003:CALL &800B:STOP
299 :
300 REM FILL ARRAY PRIOR TO POKEING
310 G=0:IF A>B THEN C=B:B=A:A=C:G=1:REM SWOP SO B>A ALWAYS
320 DIST=B-A
330 IF DIST<INC THEN GOTO 400
340 V=INT(DIST/INC):SHORTF=DIST-(V*INC)
350 FOR N=1 TO INC:T(N)=V*2:NEXT
360 T(INCH)=T(INCH)+SHORTF
370 GOSUB 440:RETURN
380 :
390 REM FILL ARRAY WHEN DIST<INC
400 FOR N=1 TO INC:T(N)=0:NEXT
410 N=1:IF DIST<1 THEN GOSUB 440:RETURN
420 T(N)=1:DIST=DIST-1:N=N+1:GOTO 410
430 '
440 FOR N=1 TO INC
445 IF T(N)=0 THEN POKE RAM,0:POKE RAM+1,0:GOTO 470
450 IF G=0 THEN VALUE=T(N) ELSE VALUE=65536-T(N)
460 POKE RAM,(VALUE-(INT(VALUE/256))*256):POKE RAM+1,(INT(VALUE/256))
470 RAM=RAM+208:NEXT
480 RETURN
490 :
500 DATA 4
510 DATA 125,125,125,175,25,25,25,275
520 DATA 125,125,175,125,25,25,275,25
530 DATA 175,125,175,175,275,25,275,275
540 DATA 175,175,125,175,275,275,25,275
580 RESTORE 500:READ W:FOR E=1 TO W*2
590 READ A,B:PLOT A,B:READ A,B:DRAW A,B:NEXT E
600 STOP
999 :
1000 RESTORE 1100
1010 FOR A=&8000 TO &80EA
1020 READ D$:POKE A,VAL("&"+D$):NEXT
1030 RETURN
1100 DATA 01,01,01,18,1E,18,24,18,2E,18,44,11,70,83,ED,53,ED,80
1110 DATA 06,0A,0E,00,C5,CD,58,80,CD,DE,80,C1,0E,01,10,F4,C9,11
1120 DATA D0,81,21,00,81,18,06,11,00,81,21,D0,81,01,D0,00,ED,B0
1130 DATA C9,21,A0,82,11,D0,81,06,1A,C5,06,08,4E,1A,77,79,12,23
1140 DATA 13,10,F7,C1,10,F1,C9,11,70,83,ED,53,ED,80,0E,01,ED,5B
1150 DATA ED,80,DD,21,00,81,3A,00,80,47,C5,DD,22,EB,80,CB,41,28
1160 DATA 12,AF,CD,DE,BB,D5,CD,CC,80,CD,EA,BB,CD,CC,80,CD,F6,BB
1170 DATA D1,DD,2A,EB,80,0E,04,C5,DD,6E,00,DD,66,01,1A,4F,13,1A
1180 DATA 47,87,09,00,DD,75,00,DD,74,01,DD,23,DD,23,13,C1,0D,20
1190 DATA E2,DD,E5,DD,2A,EB,80,3E,01,CD,DE,BB,D5,CD,CC,80,CD,EA
1200 DATA BB,CD,CC,80,CD,F6,BB,D1,DD,E1,C1,10,A3,2A,ED,80,11,68
1210 DATA 00,19,22,ED,80,C9,DD,5E,00,DD,56,01,DD,6E,02,DD,66,03
1220 DATA 01,04,00,DD,09,C9,3A,02,80,47,3A,01,80,3D,20,FD,10,F8
1230 DATA C9
1240 :
```

THREE POINT CIRCLE

◆ *Amstrad* ● *Nick Goodwin*

When disigning computer graphics displays, it is occasionally necessary to draw a circle which intersects a series of points. Unfortunately, while generating a circle from a given centre point is a straightforward operation, producing a circle, given three points – any three points will define a circle – can involve a great deal of trial and error.

The program avoids any such difficulties by generating a circle which passes through any three points given on its circumference. A cursor is provided to aid with the positioning of the points and the program is error-trapped, for example, to detect the fact that the points entered define a circle of infinite radius – such circles are sometimes also known as a straight line.

```
10 ' Three Point Circle by Nick Godwin
20 RAD
30 INK 0,1:INK 1,24:INK 2,1,24:PAPER 0:PEN 1:
BORDER 1:REM sets paper,pen & cursorcolours -
 change if required.
40 MODE 1:PRINT"This program illustrates how
to":PRINT:PRINT"construct a circle from three
 points":PRINT:PRINT"given on the circumferen
ce. A cursor is":PRINT:PRINT"provided to posi
tion the points. Ensure"
50 PRINT:PRINT"they do not fall on a straight
 line, or":PRINT:PRINT"the program will stop
with an Overflow":PRINT:PRINT"report."
60 LOCATE 10,25:PRINT"Press any key to start"
70 WHILE INKEY$="":WEND:CLS
80 INPUT "Mode (0, 1 or 2)";modex%:IF modex%<
0 OR modex%>2 THEN 80:REM select mode
90 MODE modex%:REM assign mode
100 IF modex%>0 THEN WINDOW#1,1,40,1,1 ELSE W
INDOW#1,1,20,1,2:REM define text window for c
ues & reports
110 xloc%=318:yloc%=199:REM assign cursorstar
ting location
120 CLS#1:PRINT#1,"Arrows move cursor. SPACE
BAR to plot.":REM cue
130 FOR i%=1 TO 3:REM 3 points to be plotted
140 colr%=TEST(xloc%,yloc%):REM determine col
our at cursor
150 IF modex%<2 THEN PLOT xloc%,yloc%,2:a$=IN
KEY$:IF a$=""THEN 150:REM cursor for mode 0 o
r 1
160 IF modex%=2 THEN PLOT xloc%,yloc%,1:a$=IN
KEY$:IF a$=""THEN 160:REM cursor for mode 2
170 PLOT xloc%,yloc%,colr%:REM plot cursor
180 a%=ASC(a$):REM a=ascii code of key presse
d
190 REM directional controls for cursor
200 IF a%=240 THEN yloc%=yloc%+1
210 IF a%=241 THEN yloc%=yloc%-1
220 IF a%=242 THEN xloc%=xloc%-1
230 IF a%=243 THEN xloc%=xloc%+1
240 IF a$<>" " THEN 140:REM loop back if spac
e bar not pressed
250 PLOT xloc%,yloc%,1:x%(i%)=xloc%:y%(i%)=yl
oc%:REM record of cursor locatoin selected
260 NEXT
270 x1=x%(1):x2=x%(2):x3=x%(3):y1=y%(1):y2=y%
(2):y3=y%(3):REM new variables assigned to si
mplify the complicated formulae that follow
280 CLS#1:PRINT#1,"See the three points...":F
OR j=1 TO 2500:NEXT:REM report
290 CLS#1:PRINT#1,"The circle is being drawn
through them.":REM report
300 REM find centre (cx,cy)
310 cx=((y3-y2)*(x2^2-x1^2+y2^2-y1^2)-(y2-y1)
*(x3^2-x2^2+y3^2-y2^2))/(2*((x2-x1)*(y3-y2)-(
x3-x2)*(y2-y1)))
320 cy=((x2-x1)*(x3^2-x2^2+y3^2-y2^2)-(x3-x2)
*(x2^2-x1^2+y2^2-y1^2))/(2*((x2-x1)*(y3-y2)-(
x3-x2)*(y2-y1)))
330 r=SQR(ABS(y1-cy)^2+ABS(x1-cx)^2):REM find
 the radius
340 xloc%=cx:yloc%=cy:colr%=TEST(cx,cy):PLOT
cx,cy,2:REM MOVE cursor location TO centre
350 FOR j=0 TO 24 STEP 3.75/r:REM assures cir
cumference is plotted evenly
360 REM find each x,y location and plot
370 x%=cx+r*COS(j/12*PI)
380 y%=cy+r*SIN(j/12*PI)
390 PLOT x%,y%,1
400 NEXT j
410 CLS#1:PRINT#1,"The circle is complete.":F
OR j=1 TO 2500:NEXT:REM report
420 PLOT cx,cy,colr%:REM enables cursor
430 GOTO 120:REM re-start for another circle
```

TEST CARD

◆ *Spectrum* ● *J. Fletcher*

Owners of the new Spectrum 128K computer are able to tune a TV set into the output of the machine's modulator with the aid of the pattern generator displayed when the machine is re-set while the break key is being held down. The pattern generator also helps with the setting of the TV brightness, contrast and colour controls. Spectrum Plus users who feel they are missing out on this aid to the adjustment of the TV sets need fret no more.

The program shown in figure one will display a test pattern on-screen allowing the video output of the computer to be tweaked to perfection.

On running the program, the computer will prompt for a call-sign to be entered. Having entered it, the test card will be generated aiding the optimum adjustment of all the TV set user controls.

```
  5 LPRINT CHR$ (27);"Q";CHR$ (45)
 10 REM  TEST CARD 1986
 20 REM J.G.FLETCHER G4EDD
 30:
 40 LET S$="  ":          REM 2
 50 LET D$="    ":        REM 4
 60 LET F$="        ":    REM 8
 70 LET G$="        ":    REM 8
 80 LET H$="           ": REM 11
 90 LET Q$=CHR$ 143+CHR$ 143+S$
 100 LET L$=Q$+Q$+Q$: LET B$=Q$+Q$
 110 INPUT "YOUR CALLSIGN ? ";A$
 120 GO SUB 500
 125 CLS
 130 INVERSE 0: BRIGHT 1
 140 REM GRID LINES
 150 FOR n=0 TO 255 STEP 16: PLOT N,0: DRAW 0
,175: NEXT N
 160 FOR n=0 TO 175 STEP 8: PLOT 0,N: DRAW 25
5,0: NEXT N
 170 REM TOP  CASTLELATIONS
 180 PRINT PAPER 7;S$; PAPER 0;S$; PAPER 5;S$
; PAPER 0;S$; PAPER 5;S$; PAPER 0;S$; PAPER 5
;S$; PAPER 0;D$; PAPER 5;S$; PAPER 0;S$; PAPE
R 5;S$; PAPER 0;S$; PAPER 5;S$; PAPER 0;S$; P
APER 7;S$
 190 REM BOTTOM  CASTLELATIONS
 200 PRINT AT 21,0; PAPER 7;S$; PAPER 0;S$; P
APER 4;S$; PAPER 0;S$; PAPER 4;S$; PAPER 0;S$
; PAPER 4;S$; PAPER 0;D$; PAPER 4;S$; PAPER 0
;S$; PAPER 4;S$; PAPER 0;S$; PAPER 4;S$; PAPE
R 0;S$; PAPER 7;S$
 210 REM SIDE VERT.CASTLELATIONS
 220 FOR n=0 TO 19 STEP 2
 230 PRINT AT n+1,0; PAPER 6;S$;AT n+1,30; PA
PER 6;S$;AT n+2,0; PAPER 0;S$;AT n+2,30; PAPE
R 0;S$: NEXT N
 240 REM MIDDLE VERT BLANKS
 250 FOR n=10 TO 11
```

Continued on page 76

```
 260 PRINT AT n,0; PAPER 0;S$;AT n,30; PAPER
0;S$: NEXT N
 270 PRINT AT 17,12; PAPER 1;G$;AT 18,12; PAP
ER 1;G$;AT 19,12; PAPER 1;G$
 280 REM YOUR OWN CALL HERE!
 290 PRINT AT 18,14; INK 9;A$
 300 REM YOUR OWN CALL HERE!
 310 PRINT AT 4,4;;F$;AT 4,11; PAPER 0;H$;AT
4,21; PAPER 7;F$
 320 PRINT AT 5,4;F$;AT 5,11; PAPER 0;H$;AT 5
,21; PAPER 7;F$
 330 PRINT AT 6,4;F$;AT 6,11; PAPER 0;H$;AT 6
,21; PAPER 7;F$
 340 PRINT AT 7,4;L$+S$+B$; PAPER 0;S$
 350 PRINT AT 8,4;L$+S$+B$; PAPER 0;S$
 360 REM TEST CARD COLOURS
 370 FOR N=9 TO 11: BRIGHT 1: PRINT AT N,4; P
APER 6;D$; PAPER 5;D$; PAPER 4;D$; PAPER 3;D$
; PAPER 2;D$; PAPER 1;D$: NEXT N
 380 PLOT 31,104: DRAW 190,0
 390 PLOT 32,79: DRAW 191,0
 400 PLOT 32,105: DRAW 0,38
 410 REM NEXT 3 LINES ARE 6*GRAPHICS C ,5*GRA
PHICS B,7*GRAPHICS A,6*GRAPHICS D
 420 PRINT AT 14,4;"".
 430 PRINT AT 15,4;""
 440 PRINT AT 16,4;""
 450 PLOT 33,39: DRAW 190,0
 460 PAUSE 0
 470 INVERSE 1: OVER RND*1
 480 PRINT AT 0,0;
 490 GO TO 130
 500 REM GRAPHICS A TO D
 510 FOR F=144 TO 147
 520 FOR j=0 TO 7: READ q:
 POKE USR CHR$ F+j, q: NEXT j: NEXT F
 530 DATA 85,85,85,85,85,85,85,85,204,204,204
,204,204,204,204,204,231,231,231,231,231,231,
231,231,170,85,170,85,170,85,170,85
 540 DATA 231,231,231,231,231,231,231,231
 550 RETURN
 560 SAVE "TEST CARD" LINE 10
 570 VERIFY "TEST CARD"
```

DARTS

◆ BBC ● M. J. Parrot

The game is 501 down and you are poised at the throwing line. Using the keys listed below, you must take aim at the board in an effort to launch your dart on its way to the best score. Not so easy as it sounds, as the computer player you are controlling has a touch of the shakes.

A – Up
Z – Down
K – Left
L – Right
Space bar – Fire

A well-designed screen with fast scrolling add to the enjoyment of this game in which you may elect to play the computer or a human component.

```
1234557890
Escape
>LIST
    1
    2REM COPYRIGHT (C) M.J. PARROTT, 1983
    3
   10MODE1:COLOUR2:COLOUR128:BEEB=FALSE
   20DIMR(5),S(20),SCORE(1),DARTX(3),DARTY(3
),NAME$(1)
   30PRINTTAB(15,2)"BEEB-DARTS"
   40COLOUR3
   50PRINT:PRINT"The game is 501 down."
   60PRINT"Finish on a double or the bull."
   70COLOUR1
   80PRINT:PRINT"AIMING"
   90COLOUR3
  100PRINT:PRINT:PRINT"Up.....A          Down.
....Z"
  110PRINT:PRINT"Left...K          Right....L"
  120PRINT:PRINT:PRINT"Throw with the space
bar"
  130PRINTTAB(6,20)"Will there be 1 or 2 pla
yers?"
  140REPEAT
  150A$=GET$
  160UNTIL A$="1"ORA$="2"
  170IFA$="1"THENBEEB=TRUE
  180PRINTTAB(6)"What's the name of player 1
"
  190INPUTNAME$(0)
  200IF NOT BEEB THENPRINTTAB(6)"What's the
name of player 2":INPUTNAME$(1)
  210IF BEEB THENPRINT"The BEEB will be play
er 2":NAME$(1)="BEEB"
  220PRINT:PRINT"PRESS THE SPACE BAR TO PROC
EED"
  230REPEAT
  240A$=GET$:UNTILA$=" "
  250MODE1:GCOL0,130:CLG:COLOUR130:COLOUR0
  260PROCBOARD
  270FINISH=FALSE
  280REPEAT
  290FORPLAYER=0TO1:SCORE(PLAYER)=501:PROCWR
ITESCORE
  300IFLEN(NAME$(PLAYER))>6THENNAME$(PLAYER)
=LEFT$(NAME$(PLAYER),6)
  310NEXT
  320PLAYER=1
  330GAMEOVER=FALSE
  340REPEAT
  350PLAYER=ABS(PLAYER-1):DART=0:TSCORE=0
  360PROCWRITENAME
  370REPEAT
  380DART=DART+1
  390 DOUBLE=FALSE:BUST=FALSE:WIREFLAG=FALSE
  400X=RND(470)-235:Y=RND(470)-235
  410PROCMOVECROSS
  420IFPOINT(X,Y)=2AND RND(7)=2THEN WIREFLAG
=TRUE
  430PROCDART(X,Y)

  440*FX15,1
  450PROCTHUD
  460PROCSCORE
  470IFR<R(1) OR R>R(5)THENWIREFLAG=FALSE
  480PROCWRITESUB
  490PROCTOTALISE
  500UNTIL DART=3 OR GAMEOVER OR BUST
  510IF NOT BUST THENSCORE(PLAYER)=SCORE(PLA
YER)-TSCORE
  520PROCWAIT
  530*FX15,1
  540PROCCLEARBOARD
  550PROCWRITESCORE
  560UNTILGAMEOVER
  570PROCWRITEND
  580REPEATA$=GET$:UNTIL A$="N"ORA$="Y"
  590IFA$="N"THENFINISH=TRUE
  600PROCWRITEND
  610VDU4
  620UNTIL FINISH = TRUE
  630MODE1:PRINTTAB(10,10)"BYE"
  640END
  650
  660DEF PROCSCORE
  670DARTX(DART)=X:DARTY(DART)=Y
  680R=SQR(X^2+Y^2):IFR<R(0)THENSCORE=50:DOU
BLE=TRUE:ENDPROC
  690 IFR<=R(1)THENSCORE=25:ENDPROC
```

PROGRAM LISTINGS

```
700IFR>R(5)THENSCORE=0:ENDPROC
710IFWIREFLAG THENSCORE=0:ENDPROC
720THETA=ACS(X/R):IFY<0THENTHETA=2*PI-THET
A
730THETA=INT(0.7+THETA*10/PI-PI/20)
740SCORE=S(THETA):IFR>=R(4)THENSCORE=SCORE
*2:DOUBLE=TRUE:ENDPROC
750IFR<R(3)ANDR>=R(2)THENSCORE=SCORE*3:END
PROC
760ENDPROC
770
780DEF PROCWRITESUB
790IFWIREFLAG THENPRINTTAB(1+PLAYER*34,25+
DART)"wire"ELSEPRINTTAB(1+PLAYER*36,25+DART)
;SCORE
800ENDPROC
810
820DEF PROCDART(X,Y)
830D=DIF/2
840MOVEX-D,Y-D
850DRAWX+D,Y+D
860MOVEX-D,Y+D
870DRAWX+D,Y-D
880ENDPROC
890
900DEFPROCMOVECROSS
910GCOL3,2
920REPEAT
930PROCRANDOM
940IFX <XMIN THENX=XMIN
950IFX >XMAX THENX=XMAX
960IFY <YMIN THENY=YMIN
970IFY >YMAX THENY=YMAX
980PROCCROSS
990A$=INKEY$(10)
1000PROCCROSS
1010IFA$="A" Y=Y+MOTE
1020IFA$="Z" Y=Y-MOTE
1030IFA$="K" X=X-MOTE
1040IFA$="L" X=X+MOTE
1050IFBEEB AND PLAYER=1THENPROCMYGAME
1060UNTILA$=" "
1070ENDPROC
1080
1090DEF PROCCROSS
1100MOVEX-DIF,Y
1110DRAWX+DIF,Y
1120MOVEX,Y-DIF
1130DRAWX,Y+DIF
1140ENDPROC
1150
1160DEF  PROCBOARD
1170XMIN=-630:XMAX=630:YMIN=-512:YMAX=512:D
IF=50:MOTE=15
1180FORI=0TO20:READS(I):NEXT
1190VDU5:VDU29,640;512;
1200R(0)=18:R(1)=50:R(2)=250:R(3)=280:R(4)=
440:R(5)=470:C=COS(PI/50):S=SIN(PI/50):K=1
1210FORI=PI/20TO2*PI-PI/20STEPPI/10
1220C1=COS(I):S1=SIN(I)
1230FORL=1TO4
1240GCOL0,K:K=ABS(K-1)
1250PROCSECTOR(R(L)*C1,R(L)*S1,R(L+1)*C1,R(
L+1)*S1)
1260NEXTL
1270GCOL0,K:K=ABS(K-1)
1280NEXTI
1290FORI=0TO19:MOVE490*COS(I*PI/10)-300-25*
((S(I)=18)+(S(I)=13)+(S(I)=10)+(S(I)=15)),49
0*SIN(I*PI/10)+10
1300PRINTS(I):NEXT
1310GCOL0,2
1320FORI=PI/20TO2*PI-PI/20STEPPI/10
1330X=R(5)*COS(I):Y=R(5)*SIN(I)
1340MOVE0,0:DRAWX,Y
1350NEXT
1360FORI=2TO4:PROCCIRCLE(R(I)):NEXT
1370GCOL0,0
1380C=PI/10:MOVE0,0
1390FORI=1TO21:X=R(0)*COS(C*(I-1)):Y=R(0)*S
IN(C*(I-1))
1400MOVE0,0:PLOT85,X,Y
1410NEXTI
1420VDU4
1430ENDPROC
1440
1450DEF PROCSECTOR(X,Y,X1,Y1)
1460MOVEX,Y:DRAWX1,Y1
1470FORJ=1TO5
1480T=X*C-Y*S:Y=Y*C+X*S:X=T
1490PLOT85,X,Y
1500T=X1*C-Y1*S:Y1=Y1*C+X1*S:X1=T
1510PLOT85,X1,Y1
1520NEXTJ
1530ENDPROC
1540
1550DEF PROCTOTALISE
1560IFSCORE=SCORE(PLAYER)-TSCORE ANDDOUBLE=
TRUE THEN GAMEOVER=TRUE:ENDPROC
1570IFSCORE>=SCORE(PLAYER)-TSCORE-1THENPROC
BUST:ENDPROC
1580TSCORE=TSCORE+SCORE
1590ENDPROC
1600
1610DEF PROCBUST
1620SOUND 1,-15,100,10
1630BUST=TRUE
1640ENDPROC
1650
1660DEF PROCWRITESCORE
1670FLAG=FALSE:SCORE=SCORE(PLAYER)
1680IFSCORE<41AND(SCORE/2-INT(SCORE/2))<0.1
THENSCORE=SCORE/2:FLAG=TRUE
1690PRINTTAB(1+PLAYER*35,4);"   "
1700PRINTTAB(1+PLAYER*35,4);SCORE;
1710IFFLAG PRINT "x"
1720ENDPROC
1730
1740DEF PROCCLEARBOARD
1750FORI=1TODART
1760PROCDART(DARTX(I),DARTY(I))
1770PRINTTAB(1+PLAYER*34,25+I);"
1780PROCWAIT
1790NEXTI
1800ENDPROC
1810
1820DEF PROCCIRCLE(R)
1830C=COS(0.05):S=SIN(0.05):X=R:Y=0
1840MOVEX,Y
1850FORJ=1TO120:T=X*C-Y*S:Y=Y*C+X*S:X=T
1860DRAWX,Y
1870NEXTJ
1880ENDPROC
1890
1900DEF PROCWAIT
1910FORJ=1TO1000:NEXTJ
1920ENDPROC
1930
1940DEF PROCMYGAME
1950PROCWAIT
1960A$=" "
1970IF SCORE(PLAYER)>100THENX=0:Y=R(2)+10:P
ROCRANDOM:ENDPROC
1980IF SCORE(PLAYER)-TSCORE>100THENX=0:Y=R(
3)+25:PROCRANDOM:ENDPROC
1990IF SCORE(PLAYER)-TSCORE>61THENX=30:Y=R(
3)+30:PROCRANDOM:ENDPROC
2000IFSCORE(PLAYER)-TSCORE=50THENX=0:Y=5:PR
OCRANDOM:ENDPROC
2010IF SCORE(PLAYER)-TSCORE>40THENX=R(3)+30
:Y=0:PROCRANDOM:ENDPROC
2020SCORE=(SCORE(PLAYER)-TSCORE)/2
2030IFSCORE-INT(SCORE)<.1THENI=0:REPEAT:I=I
+1:UNTILSCORE=S(I):THETA=PI*I/10-PI/20:R=R(4
)+5:X=R*COS(THETA):Y=R*SIN(THETA):ELSEX=80:Y
=330
2040PROCRANDOM
2050ENDPROC
2060
2070DEF PROCRANDOM
2080D=RND(3)-2:E=RND(3)-2
2090X=X+D*15:Y=Y+E*15
2100ENDPROC
2110
2120DEF PROCWRITEND
2130PRINTTAB(1,2)"      "
2140VDU5:GCOL3,3
2150MOVE-640,504:PRINT"WINNER: ";
2160PRINTNAME$(PLAYER)
2170PRINT"ANOTHER GAME?"
2180PRINT"Y/N"
2190ENDPROC
2200
2210DEF PROCWRITENAME
2220IFPLAYER=0THENPRINTTAB(32,2)"        "ELS
EPRINTTAB(1,2)"        "
2230SOUND1,-15,100,3
2240PRINTTAB(1+33*PLAYER,2)NAME$(PLAYER)
2250ENDPROC
2260
2270DEF PROCTHUD
2280SOUND0,-15,6,5
2290ENDPROC
2300
2310DATA6,13,4,18,1,20,5,12,9,14,11,8,16,7,
19,3,17,2,15,10,6
```

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Beyond have recently launched the Commodore 64 version of their hit game *Doomdark's Revenge*. This version of Doomdark comes with an audio cassette featuring a narrative that sets out the scene for the game.

If you have an earlier version of *Doomdark's Revenge,* you won't have the audio cassette, your're missing out on something special. Even if you do not have the game, the tape makes interesting listening.

To win one of the 100 tapes we have to give away, study the screen shot from Doomdark's Revenge and tell us, in not more than 20 words, what the characters may be saying to each other.
The winners of the competition will be those entries that, in the opinion of the judges, contain the most amusing outline conversation between the characters from the game.

COMPETITION RULES

- The winners will be the people who send the most amusing 20 word script for the characters depicted in the *Doomdark's Revenge* screen shot.
- The names of the winners will be announced in the July issue of *Your Computer*.
- All entries must arrive at the *Your Computer* offices by the last working day of May, 1986.
- Each person may enter the competition only once.
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Do not forget to enclose this coupon, or a photocopy of it, when you send your entry, marked *Doomdark's Revenge* Competition, to the *Your Computer* editorial offices at 79-80 Petty France, London SW1H 9ED.

I think the characters from *Doomdark's Revenge* are saying____________________

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DREAM MACHINE – AMIGA



Dream machine, nightmare price

Have you ever dreamed of having a collection of your favourite arcade-quality games machines in the corner of the bedroom? For many of us, even the graphics offered by the best games home computer cannot match those on dedicated machines and forces us back to the arcades like a teetotal lemonade drinker turning back to alcohol as we slot 10 pence pieces uncontrollably into the machines.

This month's Dream Machine, despite its business aspirations, has the potential to take arcade computing power to your home or office. It is the Commodore Amiga, the more expensive but powerful rival to the Atari ST, due to be released in Britain later this year.

The Amiga is the perfect games machine. It combines a super-fast 68000 CPU, running at 7.16MHz, with three custom-made chips controlling the high-resolution graphics and stereo four channel sound output. Add to that the Amiga's enormous memory and you have the facilities for complex animation and detailed artistic work, as well as the use of powerful, multi-tasking business programs.

Amiga in action

Although the U.K. price has yet to be announced, the Amiga retails at $1,790 in the U.S. for the basic system with a RGB high-resolution colour monitor, 256K memory and an integral 880K 3.5 in. disc drive. At that price it is well beyond the budget of most home users in Britain but there is nothing to prevent us dreaming about it. The U.S. price is rumoured to be falling to near £1,000 for the basic system and the planned U.K. price will be about £1,500.

The Amiga's speed of processing and graphic capabilities are by far its strongest attractions. The three custom chips, affectionately called Angus, Denise and Paula, handle the graphic display and sound with a minimum of CPU intervention, so the Amiga is as fast as possible. Ironically those chips initially were responsible for slowing things – production of the Amiga was delayed for some time as they became the subject of a law-suit between Atari and Commodore.

For games players, the speed and lack of CPU intervention means complex animation in high resolution is possible without the computer grinding to a halt. For the business user, the Amiga combines the simplicity of the Apple Macintosh with colour and super-fast multi-tasking so, for instance, the Amiga will search for and print-out a record in your database while you prepare the letter to accommodate it.

Compared to the radically-shaped Atari ST, the Amiga is conservative; fashioned in the usual cream plastic and resembling a small IBM with a single 3.5in. disc drive. The keyboard is separate from the main body of the Amiga and with its legs folded will slide neatly underneath the computer. That is particularly useful if you need some desk space when the computer is not in use and gives you a little more space to swing the mouse. Unfortunately, the colour monitor looks rather cumbersome perched on top.

The Amiga is bursting with potential in many ways. Graphics aside, the four-channel stereo sound output gives musicians the option to control keyboards and drum synthesisers using the appropriate software, at a fraction of the cost of a Fairlight which retails at about £50,000.

The availability and quality of software for the Amiga eventually will decide its fate in the U.K. It is supported by several American software houses; one is Electronic Arts, which has several programs in the pipeline and a few already published.

The quality of software should be excellent. The new generation of Amiga programmers swoon over the machine specification as we dream about its performance, so rest assured they will take it to the limit. There is a danger, however, which has already shown itself – numerous programs for the Amiga are conversions from developments on the Atari ST and Apple Macintosh and do not take advantage of the extra features the Amiga has to offer.

In the U.S. the superior graphics capabilities have led to widespread use of the Amiga by computer artists. With a maximum resolution of 640 x 400 pixels and 4,096 colours from which to choose, an artist can produce some spectacular work created either from scratch using one of the many advanced drawing packages or adapted from video still pictures which have been 'grabbed' and printed on-screen.

In the future, with an additional 8MB of internal RAM attached, complete sequences of film could be used interactively with computer-generated characters and text. At present, the computer can mix text and video stills – perfect for estate agents and manufacturers who require a visual accompaniment to their text-based descriptions.

At the back of the machine Commodore has excelled itself more than usual. Apart from the keyboard and power connections, there are parallel and serial ports for printers and modems, three video ports – RGB, composite and TV – and two sound outputs for left and right speakers.

The keyboard is also unusually generous, with 10 function keys and a separate numeric keypad. Either side of the space bar are two Amiga keys, used with 'Ctrl' for a soft re-set.

The Amiga is in a category of its own, bridging the gap between the expensive home computer market and relatively inexpensive business computers. You could buy an IMB compatible for less than an Amiga and have a vast range of software from which to choose but the difference is the Amiga's greater speed, user-friendliness and, above all, its versatility. It will be competing in a market in which others have previously floundered but by offering more than any other computer it has the potential to succeed.

Geof Wheelwright.

The Amiga may well be a machine of which dreams are made but dreams could be the only place the machines make any kind of appearance in volume.

At press time, the word was that Commodore would be selling the Amiga complete with colour monitor, 512K and two 3.5in. disc drives for about £1,800 and that it would target the Amiga heavily into the business computer market. The difficulty, as with any new machine, is getting a good base of software to encourage initial sales.

The worry is that Commodore may be living in a dream world in its plans to sell this dream machine. We can only hope it wakes up in time either to bring down the price to a realistic level for the home buyer or develop sufficient business software.

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3. ***What is the motto of the SAS?***
   a) Death or glory b) In God we trust c) Who dares wins
4. ***What is the cap badge of the SAS?***
   a) A winged dagger b) Crossed rifles c) A winged horse
5. ***What is the colour of the SAS beret?***
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- Each person may enter the competition only once.
- Entries to the competition cannot be acknowledged.
- No employees of Focus Investments nor their agents or close relatives may enter the competition.
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- Focus Investments assumes no responsibility or liability for any complaints arising from this competition.

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Special Features

Contents subject to late revision

BUYERS' GUIDE
We lend an ear to some micro speech synthesis systems and try to talk some speech recognition units into obeying our every command.

DREAM MACHINE
The RM Nimbus could be described as a computer with a low-profile, at least as far as the vast majority of people are concerned. In education circles though the machine is well respected. Its elegant 16 bit, no compromise, design also make it a machine that deserves a wider recognition.

LOGO PROGRAMMING
If you buy an Amstrad CPC6128 or PCW8256/8512 computer, you will also get a copy of DR's Logo programming language. Most people think of Logo as simply a language that can be used to control turtles. Logo though can be used for far more than simple control programming – if, that is, you know how.

Next month we begin a series of articles that show how Logo may be used to program anything from a simple arcade game to a useful general purpose data-base.

LOW COST PC COMPATIBLES
Amstrad are set to launch a low cost PC clone in the early summer. Amstrad though will not be the only company to offer a sub-£500 PC, a number of low cost systems are at present available.

Next month we review one such machine, setting the scene for Amstrad's entry into the market.

PCW8256/8512 SOFTWARE SURVEY
As sales of the PCW computer continue to go from strength to strength we review a number of packages designed to get the most out of this computer.

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PLUS
Part Four of the Your Computer Course. We continue our introduction to the world of home computer programming with further articles covering graphics, sound and programming techniques.

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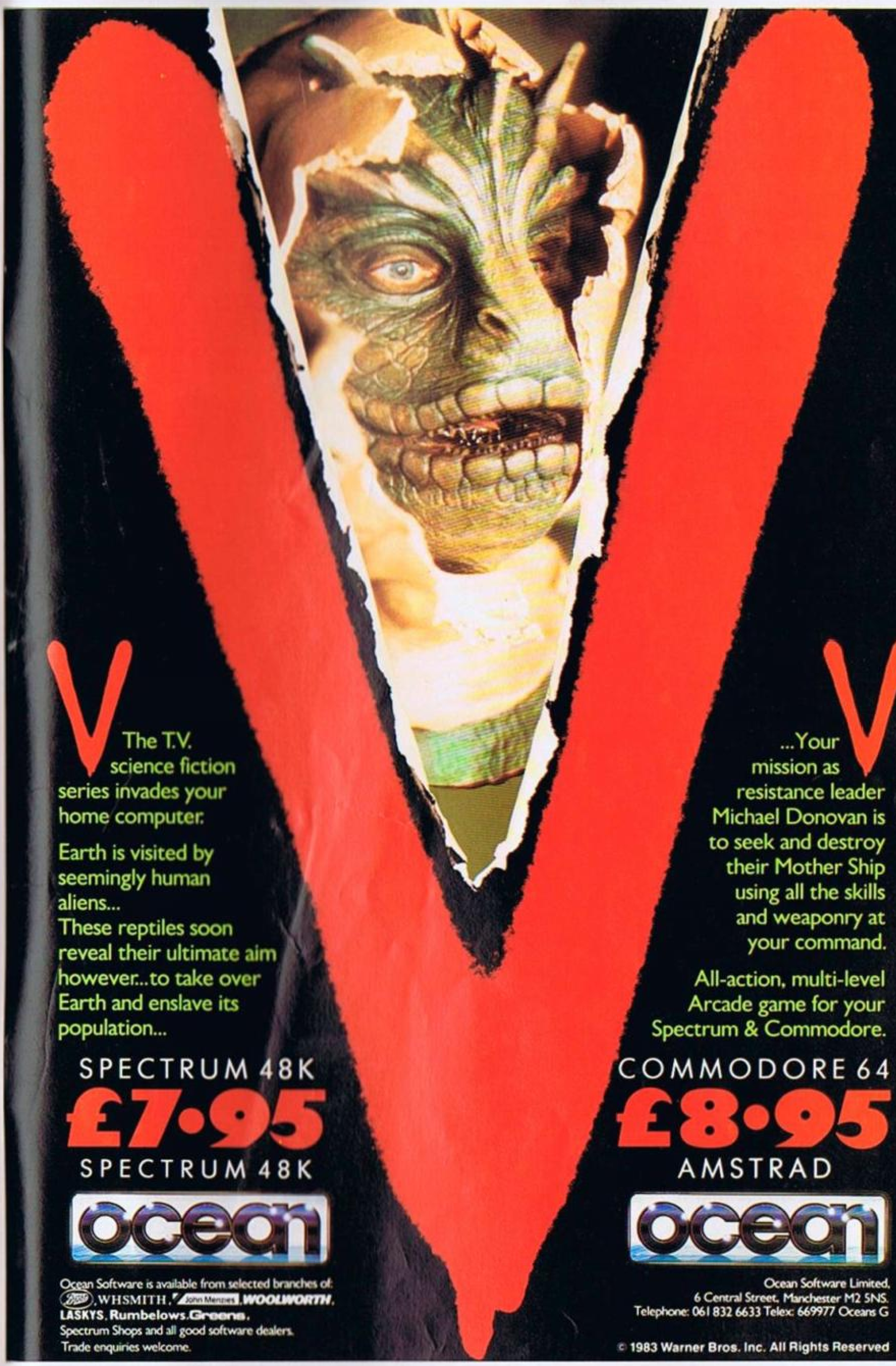
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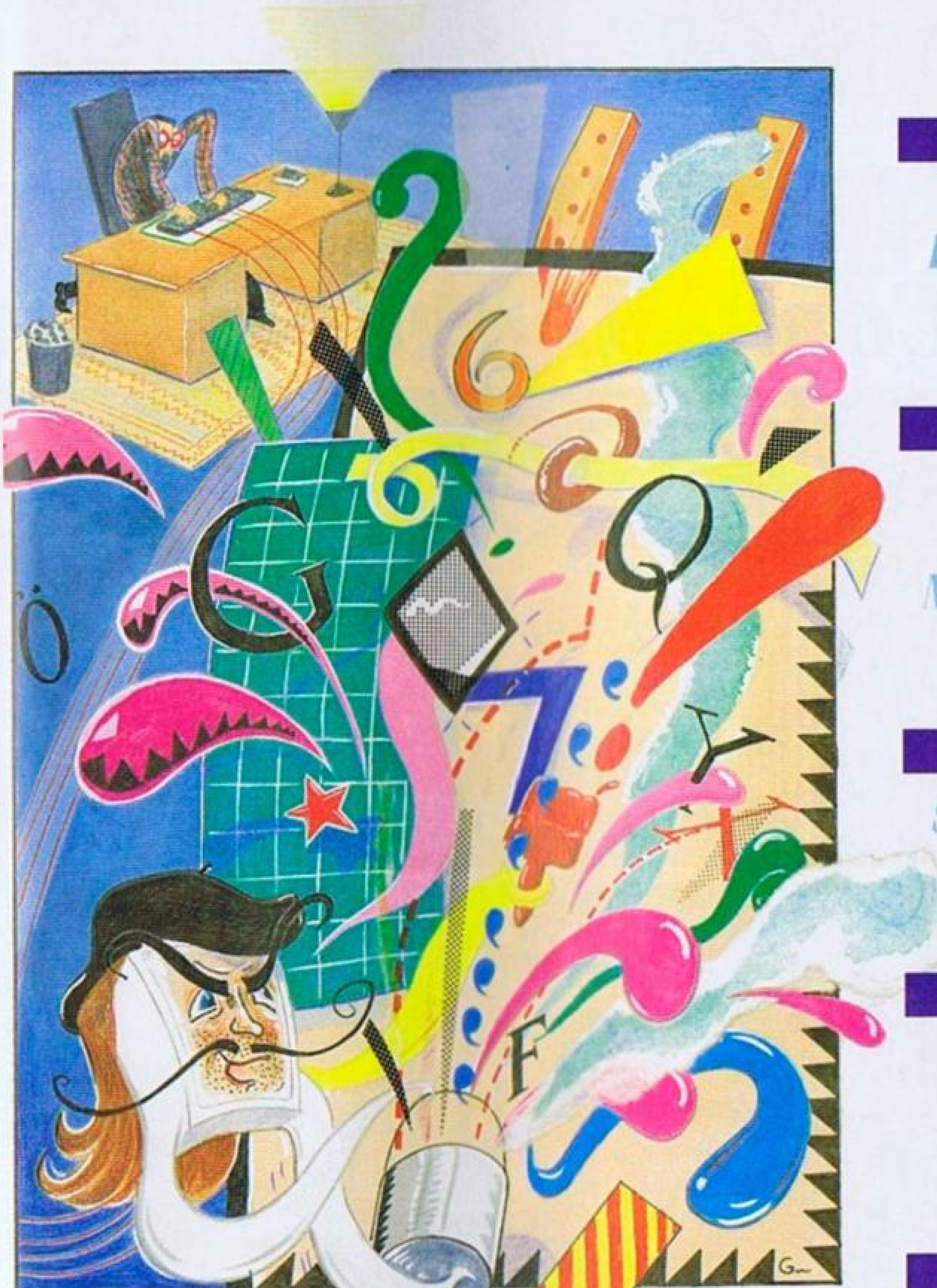

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CPC MUSICIANS TAKE NOTE

PAINTING BY NUMBERS

GETTING A LINE ON COMPUTER GRAPHIC TECHNIQUES

Welcome to the third part of the *Your Computer Course*. We hope that you have found the lectures so far both stimulating and refreshing, as well as informative.

This month's instalment features articles which cover all aspects of home computing. We begin by looking at computer graphics. It is one of the major growth areas in the home computer market – a wealth of high-quality software and hardware add-ons has reached the market in recent months. Those tools mean that the creation of professional-quality graphics is no longer the sole province of the graphic artist but is within grasp of every micro user.

Our guide to computer jargon continues on page 20; this month John Lettice covers letters I to L, from IBM to Loops.

Those who are interested in machine code programming will find an introduction to low-level coding on the 68xxx series of MPUs.

Music is another area gaining in popularity and this month we show users how to make the most of the Programmable Sound Generator which is responsible for the generation of music on the Amstrad CPC range of computers.

To round off this instalment of the course, Geof Wheelwright assesses two implementations of the Pascal programming language.

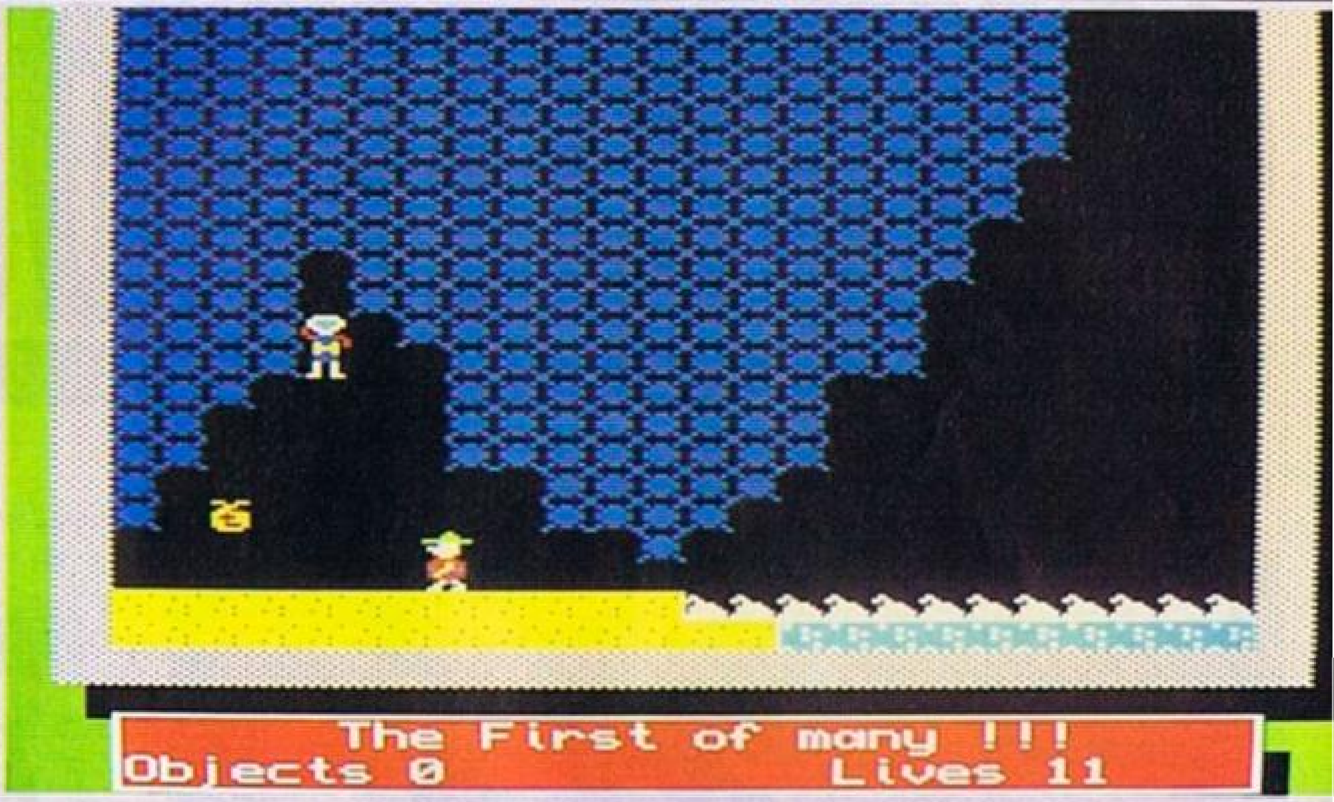
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Contributors:

David Janda

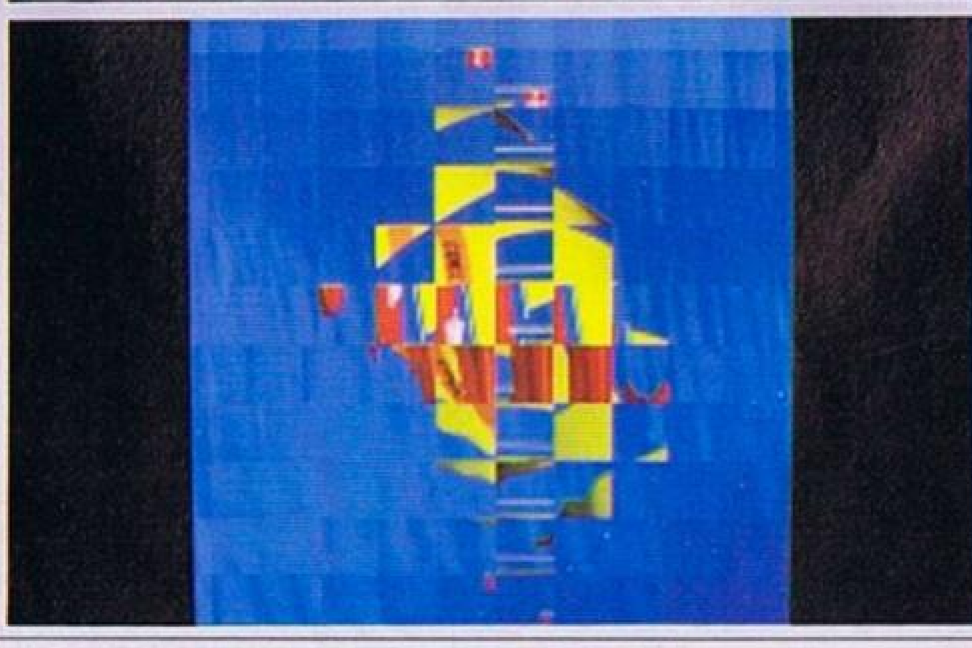
John Lettice

Geof Wheelwright



Computer generated







Of all the applications which can be set for a micro, few are immediately as rewarding as the generation of on-screen pictures or graphics. With the advent of modern paint software and sophisticated input devices such as the mouse, the touch tablet and the light pen, developing graphics is much easier than it used to be when all you had to hand was a grid sheet and a table of available screen colours.

You can, of course, still draw pictures on-screen by using programming methods, although many pictures used by commercial software programmers these days are either digitised using a video camera and an interface to a micro or painted using some form of sophisticated computer paint software.

On this page you will see some examples of both methods. Figures one and two show short programs for the Commodore 64 and Spectrum respectively which allow you to generate your own very rudimentary pictures using the computer's existing character set and the keyboard, while the photos show the kind of drawing program – in this case it is *QL Paint* for the Sinclair QL – which make painting your masterpieces a much easier job.

Painting attractive-looking pictures, however, is not likely to be the only application you will have for the graphics capabilities of your micro. With the high resolution available on many of the new machines – i.e., the 640 by 400 pixel resolution on the new Atari 520STM – and even the medium resolution on older machines you can consider various forms of real-world modelling.

Dedicated programs to accomplish it are often found only on more expensive machines – often under the name CAD/CAM, Computer Aided Design/Computer Aided Manufacturing – and relate largely to the design of three-dimensional shaded widgets in colour on-screen.

Again, however, such software is more often an applications solution rather than a programming solution to the problems of real-world modelling. You are simply given the tools for design, just as a draughtsman might be given an easel and a set of rulers and pencils, and you go ahead and draw.

A far more interesting idea has been developed in recent years with the discovery of a mathematical model of the real world known as a fractal. Fractals work on much the same principles as calculus; by chopping sections of a picture into its smallest possible components you will be able to obtain a series of straight lines from which it can be built.

Fractal drawings can be used to develop a highly-realistic image. The kind of work that can be done on bigger machines using fractal modelling techniques is helping designers to replace the conventional drawing board with sophisticated design and simulation systems.

Geof Wheelwright.

raphics



Figure 1 – Commodore listing

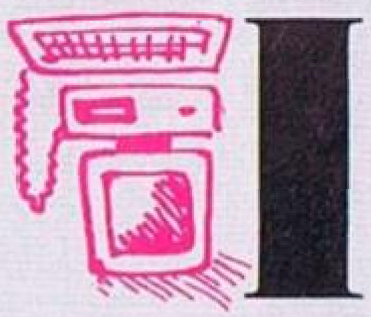
```
10 PRINT CHR$(147)
12 POKE 53280,0:POKE 53281,0
15 Q=1484:C=55756
40 S=1
50 GET B$: IF B$="" THEN 50
60 IF B$=CHR$(17) THEN Q=Q+40:C=C+40
70 IF B$=CHR$(145) THEN Q=Q-40:C=C-40
80 IF B$=CHR$(157) THEN Q=Q-1:C=C-1
90 IF B$=CHR$(29) THEN Q=Q+1:C=C+1
95 IF Q>2023 THEN Q=Q-40:C=C-40:GOTO 50
97 IF Q<1024 THEN Q=Q+40:C=C+40:GOTO 50
100 POKE Q,27
110 POKE C,S
120 S=INT(RND(1)*15)
130 GOTO 50
```

Figure 2 – Spectrum listing

```
10 CLS
11 INK 7
12 PAPER 0
13 BORDER 0
14 CLS
15 LET X=11:LET Y=16
20 PRINT AT X,Y;"["
30 LET B$=INKEY$: IF B$="" THEN GOTO 30
40 IF B$="A" THEN LET X=X-1:PRINT AT X,Y;"["
42 IF B$="S" THEN LET X=X-1:PRINT AT X,Y:" "
45 IF B$="Z" THEN LET X=X+1:PRINT AT X,Y;"["
52 IF B$="X" THEN LET X=X+1:PRINT AT X,Y;" "
60 IF B$="N" THEN LET Y=Y-1:PRINT AT X,Y;"["
62 IF B$="J" THEN LET Y=Y-1:PRINT AT X,Y;" "
70 IF B$="M" THEN LET Y=Y+1:PRINT AT X,Y,"["
72 IF B$="K" THEN LET Y=Y+1:PRINT AT X,Y:" "
80 GOTO 30
```

Your COMPUT

**The jargon which pervades the comp
language than a tool to effective com
know. By following John Lettic
can be fluent in the hi-tech pa**



■ **IBM:** International Business Machines is what the world's largest microcomputer manufacturer would claim IBM stands for. Other suggestions are Incredibly Boring Machines, Imperialism By Marketing and Infinite Bucks Made.

■ **IC:** Integrated circuit, which is a collection of transistors, capacitors and so on built on to one small silicon chip. Also Investors' Chronicle.

■ **IF . . . THEN:** One of the basic constructions of structured programming, telling the computer that IF a certain condition exists THEN it should do something specified. Most Basics have an ELSE addition to the construct, allowing the computer to potter on without showing the slightest bit of initiative itself. Easy life.

■ **Impact printer:** A printer designed specially to survive being thrown out of windows, or other comparable impacts. Alternatively, a printer which transfers the image to paper by hitting an inked ribbon.

■ **Increment:** To increase a sum by adding a number is known as an increment. No connection to annual increment, which is a sum added to your salary infrequently and under protest by your employer.

■ **Initialise:** Initialisation is the process undergone when a bank cashier notices you have put the wrong date on your cheque. It can also mean setting the value of a variable some time before its use.

■ **Input:** The raw material, or garbage, sent to the computer through the keyboard or other peripheral device, to be acted on. See **Error message.**

■ **Instruction:** A part of the computer manual referring obscurely to a part of the computer which has been fitted/has been modified since the manual was printed/has fallen off. Also a command in a Basic listing. See **Error message.**

■ **Instruction set:** A manual which has not been collated by the manufacturer, or the complete set of instructions a given processor can understand.

■ **Integer:** A whole number, whether negative, positive or zero.

■ **Integer variable:** A variable which can only be a whole number, but as it is variable, one you can't remember.

■ **Intel:** A company responsible for the CPUs in the best-selling IBM PC series. Despite this, Intel is a highly successful manufacturer.

■ **Intelligent device:** Any device which has processing power of its own, as opposed to a dumb terminal, which can only send and receive data from elsewhere. By this definition, the merest simpleton or status quo fan/Arsenal supporter is "intelligent".

■ **Interface:** Varying degrees of assault, ranging from joystick interface – three months – through to printer interface – life imprisonment, no remission. Also the link between two devices, for example allowing a micro to drive a printer.

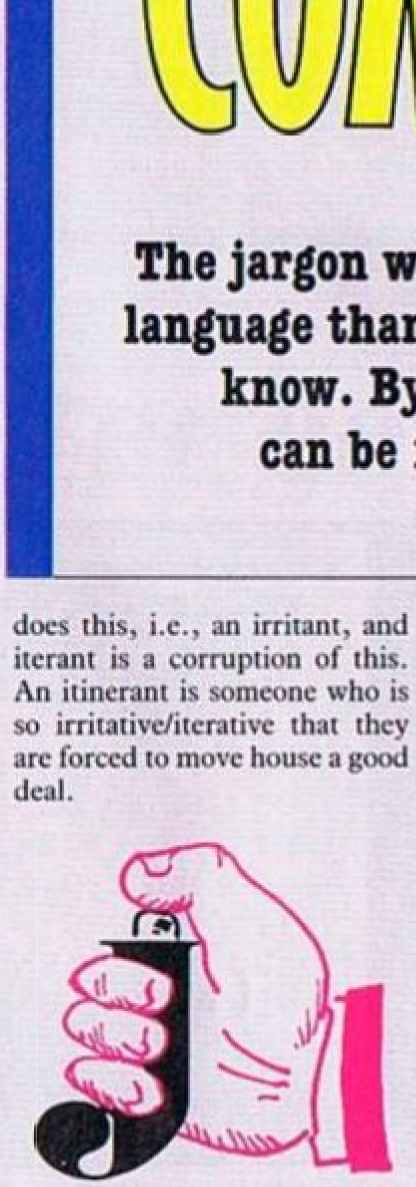
■ **Interpret:** To change a high-level language like Basic into machine language understandable by the computer.

■ **Interrupt:** A way of stopping the execution of a program for a small amount of time while another action is performed, giving the impression that two things are being done at the same time.

■ **Inversion:** In binary, turning a number upside down so that all the ones become zeros and the zeros ones. You can't easily do this in decimal, unless you have a dodgy accountant.

■ **I/O:** An expression first used by Walt Disney – "I/O, I/O, it's off to work we go . . ." – but now used to mean input/output. The various sockets allowing a computer to communicate with the outside world are known as I/O ports.

■ **Iteration:** An iteration is one cycle of a loop, while the process of iteration means repeating cycles over and over again. You probably know someone who does this, i.e., an irritant, and iterant is a corruption of this. An itinerant is someone who is so irritative/iterative that they are forced to move house a good deal.

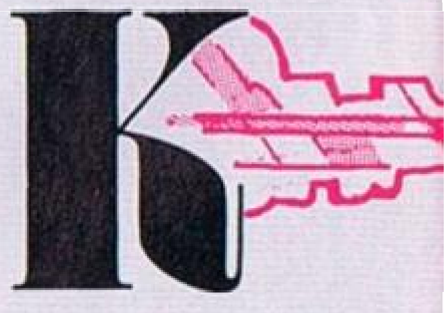


■ **Joystick:** A device used for input by people whose fingers, through thumping the cursor keys too hard, have grown too dumpy and calloused for them to use the keyboard.

■ **Jump:** The same as branch, i.e., a point in a program where it can go in two directions. Jump sounds much faster and is therefore used if the program is appallingly slow.

■ **Junction:** A point where railways branch away from one another, or where electrical lines do likewise. The computer-related meaning is far too esoteric to worry about but there aren't many Js.

■ **Justify:** Having to explain the entry above to the editor. Also a technical term used by manufacturers when their machines are late. See hook. See line. See Sinclair. Of printed text, it means having the text aligned on both sides. Left-justified means aligned on the left, right-justified aligned on the right. There aren't many Js, are there?



■ **K:** Short for kilobyte, from the Greek kilo, which means 1,000. Computers, however, understand it as meaning 1,024. See **Arithmetic.**

■ **Key:** You used to be able to tell the difference between com-

R COURSE

p r industry seems more like a foreign
n nications for those who are not in the
e' uide to computer-speak you, too,
n nce spoken by computer people.

puter keys and door keys by the way you couldn't lose the former. Then Sinclair launched the Spectrum Plus.

■ **Keyboard:** A device used to trap fluff, dandruff, cigarette ash and biscuit crumbs which would otherwise make a mess of the desk.

■ **Keyboard scan:** The act of looking for the biscuit crumb which makes the scrunching noise whenever you hit the Return key. Alternatively, the scanning of the keyboard by the CPU at regular and very small intervals to see if you have pressed a key. If you think about it, typing, "Oi, I've pressed a key!" wouldn't help.

■ **Keystroke:** A press of a key on the keyboard, or a heart attack suffered while searching for your key. See **Key**.

■ **Keyword:** A command the computer recognises as needing a response defined in the computer operating language, or an expletive used when looking for your keys.

■ **Kill:** Synonomous with delete and erase, invented by a programmer who read many Marvel comics. He tried Kapow! as well, but it didn't catch on.

■ **Kludge:** An improvised or botched 'quick fix' to hardware, or the sound made when you hit your dealer with the said botched hardware.



■ **Label:** A number of letters or numbers used to mark a part of a program, often used in assembly listings.

■ **Language:** A collection of words, symbols or unintelligible squiggles which, when used in the correct order, are understood by the computer. As the language is defined by the programmer, there is no logical reason why a computer language should make sense to real people. That's why they don't.

■ **Large scale integration (LSI):** See bus. see bussing. Also a small but dense integrated circuit. The progression from LSI is VLSI, or Very Large Scale Integration.

■ **LCD:** Liquid crystal display, a kind of screen display which is light, draws little power and is therefore used on portable computers.

■ **Leader:** The non-recording section at the beginning of a tape.

■ **Least significant bit:** The key on your computer with "}" and "]" on it, or in a numbering system the bit – in binary the rightmost – which has least effect on the number's total value.

■ **Least significant character:** A junior programmer, or the character at the far right of a number or word.

■ **Least significant digit:** Your little finger, or the part of a number, usually the right-most, which makes least difference to its value.

■ **LED:** Light emitting diode, one of those dinky little lights which tells you your battery is going flat.

■ **Library:** A collection of subroutines and programs commonly used by a computer. Computers can't afford their own books.

■ **LIFO:** Last in, first out. The usual way for a computer stack to operate – the last information placed on the stack is the first to be operated on. Hospitals don't work this way.

■ **Light pen:** A small pen-like device used by amateur Darth Vaders to zap information on to a CRT line driver. See **Junction.** Also an amplifier used to increase a signal between devices when they are far enough apart for the signal to degrade on the way.

■ **Line feed:** A character sent to a printer – see production editor – or display to make it move to the next line down.

■ **Line noise:** Roaring sound heard in zoos when the lions' feed is late. Also crackling on telephones or other data lines which interferes with the signal carried.

■ **Line printer:** A printer which produces a whole line of text at a time. Not to be confused with a lying printer, who produces no text at all but claims he has an excuse.

■ **Lisp:** A language uthed in artifithial intelligence applicathionth.

■ **List:** A printout or listing of a program, the command used to obtain a listing, or what happens to your desk when you put an Incredibly Big Machine (see **IBM**) on it.

■ **Listing:** You haven't moved that IBM yet, have you?

■ **Load:** Technical term meaning to put an IBM somewhere, or to enter data into the computer from a disc or tape.

■ **Loader:** A short program used to load other programs, often machine code data, into memory. Also an IBM warehouseman.

■ **Loading error:** You should have moved that IBM when I told you to do so. Also an error caused by whatever you are loading the program from not getting through to the computer, or vice versa.

■ **Local variable:** A variable used only in one part of a program, and invalid elsewhere.

■ **Location:** A cell of memory used for data storage. If you think of a character set as a collection of actors filming on location you will get completely confused.

■ **Logarithm:** A musical system used by lumberjacks working in unison, or a way of keeping track of numbers which are far apart. Log tables are made from trees with square roots.

■ **Logic:** The parts of hardware which govern logic operations in a computer, or the system by which philosophers avoid gainful employment.

■ **Log-on:** The act of signing on to an electronic mail service or database. Also a technical term used by lumberjacks.

■ **Look-up table:** A table of values which will be used in a program directly rather than being calculated by the computer first.

■ **Loop:** A sequence of instructions to the computer which is repeated for a set number of times, or forever, depending on how good a programmer you are.

Machine code sub-routines

Writing machine code programs in small sections has a number of advantages. David Janda introduces the techniques involved when using sub-routines within machine code programs.

Programs of any considerable size are usually made up of smaller sections. In Basic, GOSUB or PROC is used to transfer program control to a section of the program which does a specific task. A large program, then, is often made up of smaller sub-programs which are called routines.

Writing a machine code program of only 1K in length is a real task, so it is a good idea to break the program into smaller routines. Some of those routines may be applicable only for the program but others may be useful in other programs, so if written correctly it is possible to build a library of routines for future use.

The structure of a machine code routine can be described as a piece of self-contained code which performs a certain task. The routine should have one entry and exit point. The exception to this rule is when the routine. The diagram – figure one – shows the program flow for a self-contained subroutine and one which in turn calls another.

It is considered good programming practice that if subroutine A calls B and that B in turn calls C, that at the end of C control should then pass back to the next instruction in B, and so on. In other words, try to ensure

One of the best ways to learn machine code is to write small routines and the best way to use them is from within a Basic program.

that program flow does not skip past any preceding subroutines on the way back to the main program. That will ensure modularity and portability.

Writing machine code programs in smaller portions has a number of advantages. First, it makes the whole program easier to understand. It also makes the program easier to debug, as problems can be tracked down to a specific routine which can then be checked independently of the main program. Time in developing other programs can also be saved by writing small routines which may be used in more than one program.

One of the best ways to learn machine code is to write small routines and one of the best ways to use them is from Basic – that is, writing a Basic program and calling a machine code routine when necessary.

Basic is a general-purpose language and lacks speed. Writing a program in Basic and machine code is useful if, for example, there is a task which needs to be carried-out very quickly – graphics being one example. This combination of two languages – one high-level and the other low-level – is often referred to as hybrid programming.

Basic has a number of built-in commands and functions which facilitate that. PEEK and POKE, which are used to read and write to memory locations directly, can be used to pass values – results and so on – to and from machine code routines. On the Commodore 64, SYS n is used to transfer program flow to a machine code program starting at memory location n. The BBC micro has a more powerful command, CALL. That not only transfers control to a machine code program but also enables parameters to be passed to the A, X and Y registers of the 6502 microprocessor. A function common to practically all Basics is USR. It can be used in two ways.

```
LET V=USR n
```

or

```
PRINT USR n
```

where v is a numeric variable and n is the address of the machine code program to be called. The difference between USR and SYS or CALL is that it allows one parameter to be transferred from the machine code program into a Basic variable, or printed on the screen. The parameter is passed from one or more of the CPU registers depending on what machine it is.

When calling a machine code routine it is best to assume nothing. That is, you should not expect any of the CPU registers to contain a specific value unless you put it there. That can be something of a problem if, for example, routine A needs to call routine B without having any of the registers altered. One method round that is to store the contents of all the registers temporarily at the start of a routine and then restore the registers to their original contents at the end.

The stack is used for the operation and can be considered as a temporary storage area. To preserve the registers and restore them in Z-80 code, the instructions shown in figure two would have to be done.

In 6502, things are a little simpler as figure three illustrates.

There are various ways in which a machine code routine can be called from another machine code routine. In Z-80, the simplest manner is to use CALL a. That is an unconditional jump to the subroutine at the address a. The routine which was called should end with RET – short for return – which transfers program control to the next instruction after the CALL.

There are several variants of the CALL and TER instructions. They include CALLs and RETs which will be executed, depending on the state of various bits in the status register.

The 6502 uses the JSR – Jump SubRoutine – and RTS – ReTurn Subroutine – in place of the CALL and RET in Z-80. There are no variants of those two instructions.

Both the Z-80 and 6502 microprocessors have, as part of their instruction sets, instructions which are similar to Basic GOTO. They can be used in one of two ways, absolute or relative. In the absolute mode a jump is made into a specific address and in the relative mode control is passed to an instruction x number of bytes from the relative jump – no more than 256 bytes in either direction.

It is a good idea to keep machine code routines as portable as possible, that is, write them so they can be used at different places in memory. To

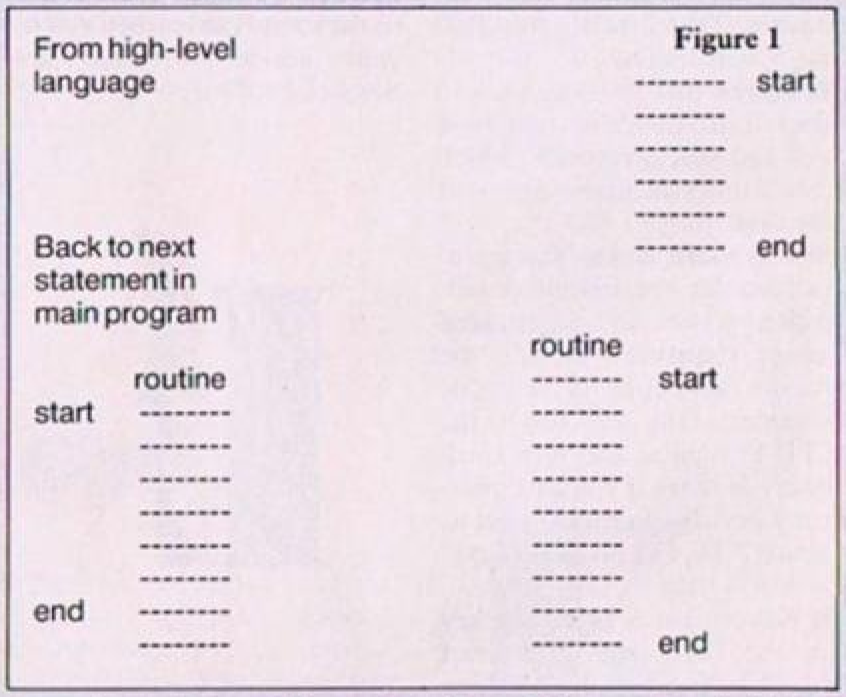


Figure 1

do that it is necessary to try to use relative jumping as much as possible rather than use absolute addressing. This idea is similar to Basic GOSUB. GOSUB requires a line number – it is absolute. Because of that the subroutine must always be at that line number. BBC Basic provides PROC, which is followed by the name of the subroutine; therefore the subroutine can be anywhere in the program. So PROC is a relative method of calling a subroutine.

INSTRUCTION	FUNCTION
PUSH HL	Save contents of H and L
PUSH DE	Save contents of D and E
PUSH BC	Save contents of B and C
PUSH AF	Save contents of A and F
CALL SUB	Call subroutine
POP AF	Restore original contents to A and F
POP BC	Restore original contents to B and C
POP DE	Restore original contents to D and E
POP HL	Restore original contents to H and L
PUSH	stores the contents of a register on to the stack while
POP	removes it

Figure 2

INSTRUCTION	
PHA	Save contents of A
PHP	Save contents of status
SUB	Call subroutine
PLP	Restore status
PLA	Restore A

Figure 3

Z-80 EXAMPLE

ASSEMBLER	COMMENTS
LD HL,FROM	Load HL with source address
LD DE,DEST	Load DE with destination address
LD BD,AMNT	Load BC with amount of bytes to be transferred
LDIR	Transfer data
RET	Finished

The example is a general-purpose copy routine which can transfer a section of memory. Registered pairs HL, DE and BC are loaded with the start address of the data to be copied, the start address where it is to be copied to, and the amount of data in bytes to be copied. The LDIR instruction is one of the most powerful in the Z-80 instruction set. The contents of the memory location pointed to by HL are transferred to the location pointed to by DE. The contents of HL and DE are then incremented by one of the contents of BC decremented by one. If BC does not equal one, the set of instructions is repeated until it does.

6502 EXAMPLE

LDA #$LB1	Load accumulator with low byte of first number
CLC	Clear carry flag before adding
ADC #$LB2	Add low byte of second number to accumulator
STA $200	Store result at memory address 200
LDA #$HB1	Load accumulator with high byte of first number
ADC #HB2	Add high byte of second number to accumulator
STA #201	Store result at memory address 201

This routine will add two two-byte numbers and store the results at memory locations $200 and $201, with the low byte at $200. The routine works by performing two one-byte additions. – *David Janda.*

Amstrad sound generator

Almost all applications can benefit from the use of sound, whether it be zaps and bangs in games or warning bleeps and buzes in application packages. In a small Basic program, handling sound should not be difficult but if you are short on memory, making music by machine code may be the answer.

Sound on the Amstrad is achieved through the AY8912 programmable sound generator. The device is capable of producing a variety of sounds with its three independently-controllable sound channels, A, B and C which produce pure tones, or white noise.

Once a sound has been set up the sound chip will take over, leaving you to do other tasks. That does not mean that you can program the chip with Beethoven's Fifth and leave it to its own devices. Only one sound per channel may be programmed at any time. To play a complete tune and do something else, some basic steps need to be followed:

Define a format for your second data which is to be read and placed into the appropriate registers. Each piece of data should include the number of the register to be loaded, together with the duration for which the note should be played.

Set up or amend the appropriate register(s).

Activate the appropriate channel, noting the time it was done. That can be done by counting the drames or by using one of the timers.

While the sound is playing, execute another part of the program. At the end of a subroutine, check to see if the desired duration of the sound has expired. This is a very rough algorithm and needs finer details before trying it.

Programming the sound generator chip directly as described is possible and useful at times but is not encouraged by Amstrad. Instead, the official entry points, of which there are 11, are recommended.

PSG REGISTERS		SOUND ENTRY POINTS	
R0	High notes value Ch A	RESET	BCA7, 1E68
R1	Low notes value Ch A	QUEUE	BCAA, 1F9F
R2	High notes value CH B	CHECK	BCAD, 206C
R3	Low notes value Ch B	ARM EVENT	BCB0, 2089
R4	High notes value Ch C	HOLD	BCB6, 1ECB
R5	Low notes value Ch C	CONTINUE	BCB9, 1EE6
R6	Noise value	RELEASE	BCB3, 204A
R7	Tone enable/disable	AMPL ENVELOPE	BCBC, 233B
R8	Ch A volume	TUNE ENVELOPE	BCBF, 233D
R9	Ch B volume	A ADDRESS	BCC2, 2349
R10	Ch C volume	T ADDRESS	BCC5, 234E

Pascal – two popular implementations

Geof Wheelwright reviews Pascal compilers from DR and Metacomco.

Most programmers go through the quest for the perfect language. After moving from Basic, most will sample a little Forth, take a trip down memory lane with Fortran and even list along with Prolog.

For most, howerver, there will inevitably be a prolonged if not permanent stop when they reach Pascal. It has long been considered a powered, structured high-level language which had much to offer the experienced programmer – long, in this case, being a little more than 12 years. The definitive work on the language was published in 1974 under the name *Pascal User Manual and Report* and outlined how the language would operate.

Since then, and particularly since the advent of the home micro, Pascal has become a popular portable language for writing software which would move easily from one machine to another. To give some idea of how that has translated into real-live software, we offer the following examples of Pascal software on two popular machines; the Amstrad 8256 and the Sinclair QL.

The Digital Research Pascal/MT+ for the Amstrad 8256 is one of the most recent versions of the language. It claims to be a full implementation of Pascal as set down in the International Standards Organisation standard DPS/7195 but also includes several extensions which enhance I/O operations, allow additional data types, offer access to the run-time system and offer modules and overlays.

The system includes a compiler, linker and programming tools and has been developed to run on a variety of operating systems and processors, the Joyce version of CP/M and its Z-80 processor being among them. DR claims a high degree of portability for this Pascal as it is consistent among its implementations, thus permitting you to switch easily between processors and operating systems. Unlike many such systems, Pascal/MT+ will let you generate software for use in a ROM-based environment, to operate with or without an operating system.

Expressions and assignments can handle input respectively from and to I/O ports; long and short integer data types are supported; and interrupt, external and assembly language procedures are included.

QL Pascal by Metacomco was one of the first to develop an extensive line of programming languages for the Sinclair QL and subsequently has made use of that 68000 expertise to develop for the Atari ST series of machines.

Its Pascal was particularly popular as it arrived at a time when powerful development languages for the machine were still relatively thin on the ground. Like the Digital Research offering for the Amstrad, QL Pascal is a high-specification implementation of Pascal designed to meet ISO 7185 standard, while taking full advantage of the target machine; in this case that means direct access to the QL Qdos windows, graphics, traps and file-handling operations.

The built-in compiler is a fast, single-pass job which produces native 68000 code. Metacomco claims compiled programs are compact and efficient, easy to use with assembler and do not require special run-time environments.

QL Pascal can address all the memory space available on the QL – up to 512K on an expanded machine – and will take variable names of any reasonable length, as well as 32-bit integers. Error-handling information is also reasonable, with more than 150 errors recognisable to the compiler and more than 30 English-language error messages generated by the run-time system.